EX PARTE OR LATE FILED

May 6, 1999

Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W., Room 8143
12th Street Lobby, TW-A325
Washington, DC 20554

RE: CC Docket No. 94-102

Dear Ms. Salas:

On May 4, 1999, the Wireless Consumers Alliance, represented by Carl Hilliard, Denise Blomme, Sharon Hilliard, Jon Linkous, David Carey met with Robert Calaff of Commissioner Powell's office at the Federal Communications Commission regarding the above referenced proceeding.

The attached information was distributed at the meeting.

Pursuant to Section 1.1206 of the Commissioner's Rules, an original and one copy of their letter and its attachments are being filed with your office.

Sincerely,

Carl Hilliard

Carl Hilliard

Attachment

Wireless Consumers Alliance

Strongest Signal Proposal

The Alliance requests that the FCC order the remove of the artificial barrier, inserted by wireless carriers, that prevents handsets from performing a normal scan of <u>all</u> channels to select the best channel available when 9-1-1 is dialed.

The following information summarizes the statements and issues before the Commission.

Wireless phones are not reliable in all emergency situations. The public is at risk.

- Safety & security is the number one reason for owning a wireless phone.
- Consumers rely on misleading and false advertising by the wireless industry. Complete coverage is just not possible.
- The industry wants to make wireless phones the primary form of personal telecommunication: "Just like your wireline phone."
- Tragedies from unconnected 9-1-1 calls are here and on the rise.

The Commission has a clear responsibility to ensure public safety. There should be NO compromise when public safety is at stake.

The Carriers control the equipment market with no interest in promoting better connections to 9-1-1.

- Carriers have blocked the deployment of strongest signal (Audiovox).
- There is no motivation for the industry to maximize public access to 9-1-1 services. It is a non-profit making service.
- Misleading consumer advertising is commonplace while emergency access abilities are misstated.

- **If the decision is left up to the carriers, the public will be shortchanged.**

Generic rule language (a handset must be able to seek out the other analog cellular carrier if the 9-1-1 call "does not go through") will NOT fix the problem.

- The handset does not know if the call is connected.
  - The handset can lock-in to an inadequate signal.
  - Poor channels can be selected.
    - Static and cross talk.
    - Dropped calls.
- Time delay – cannot exceed 12 seconds.
  - A/B Roaming
    - Re-registration can take up to 18 seconds.
    - Retry can take up to 65 seconds.
  - Strongest Signal
    - 4-6 seconds.
- Motorola's Network Solution is an alternative solution but...
  - Lengthy time to develop
    - "Lives may be unnecessarily lost waiting for appropriate technological solutions."
  - Expensive
    - Extensive changes to software/hardware for the base stations.

Strongest Signal (all channel scanning) gives the caller the best available channel of communication for 9-1-1 calls – simple A/B or even automatic A/B does not.

- Strongest signal can be quickly deployed at a trivial cost.
  - Automatic A/B will take 3 times longer to deploy. It is more complex and is more expensive.
- Call connect time favors strongest signal.
  - Strongest signal takes 4-6 seconds, up to 65 seconds for A/B.
- Automatic A/B has serious flaws
  - Lock-in limits the effectiveness of automatic A/B.
  - CTIA uses cover-up terms such as the call was "completed," "successfully sent" or the handset is in a "conversation state" to imply that the call has been connected. This is not true.
  - Automatic A/B can lead to poor quality channels with static, cross-talk and dropped calls.
- The so-called "objections" to strongest signal are without basis in fact.
  - False and misleading statements have been made over and over again:
    - *False -"Automatic A/B considers elements of call set up which Strongest Signal does not."*
    - *Misleading -"Strongest Signal will not always give you the strongest voice channel"*

Conclusion

- The Commission has found that the public interest requires access to 911 over the wireless system "that will provide the quickest and most reliable and accurate response."

- After more than four years the only viable solution that has been proposed is strongest signal.

Software Modifications

Strongest Signal

Strongest/Adequate Signal

Strongest Signal

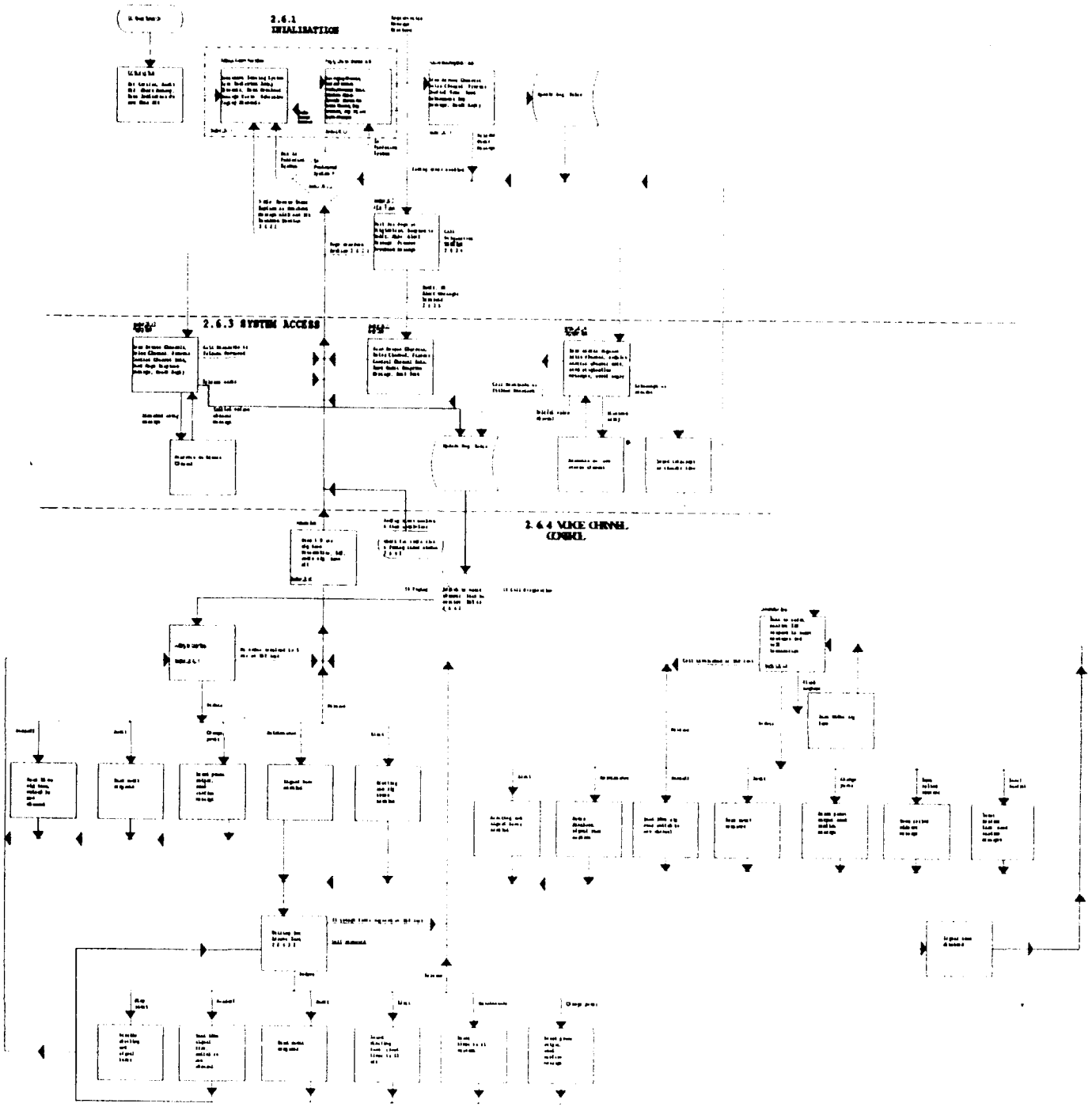
Scan all 42 control channels

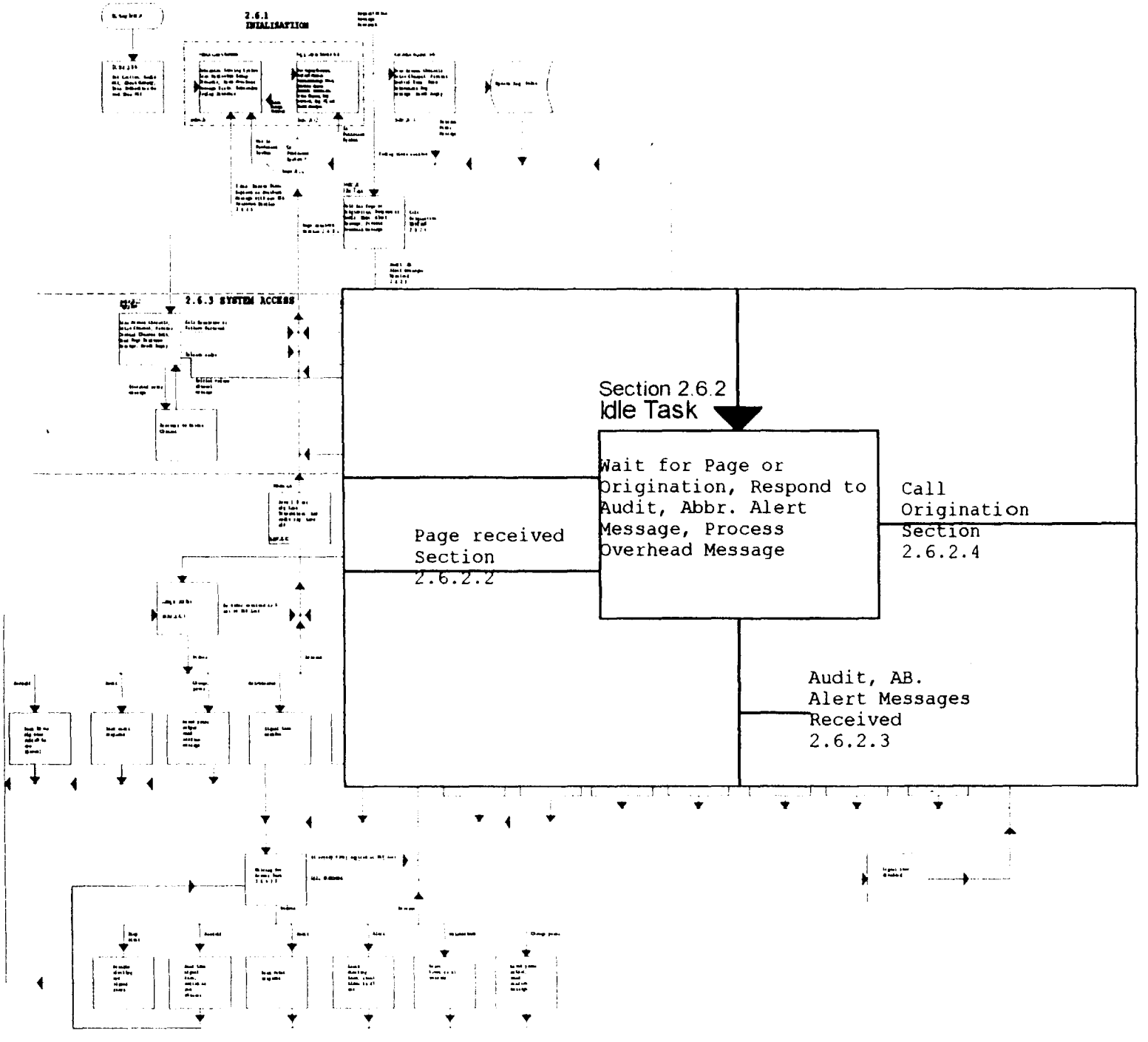
Section 2.6.3.2

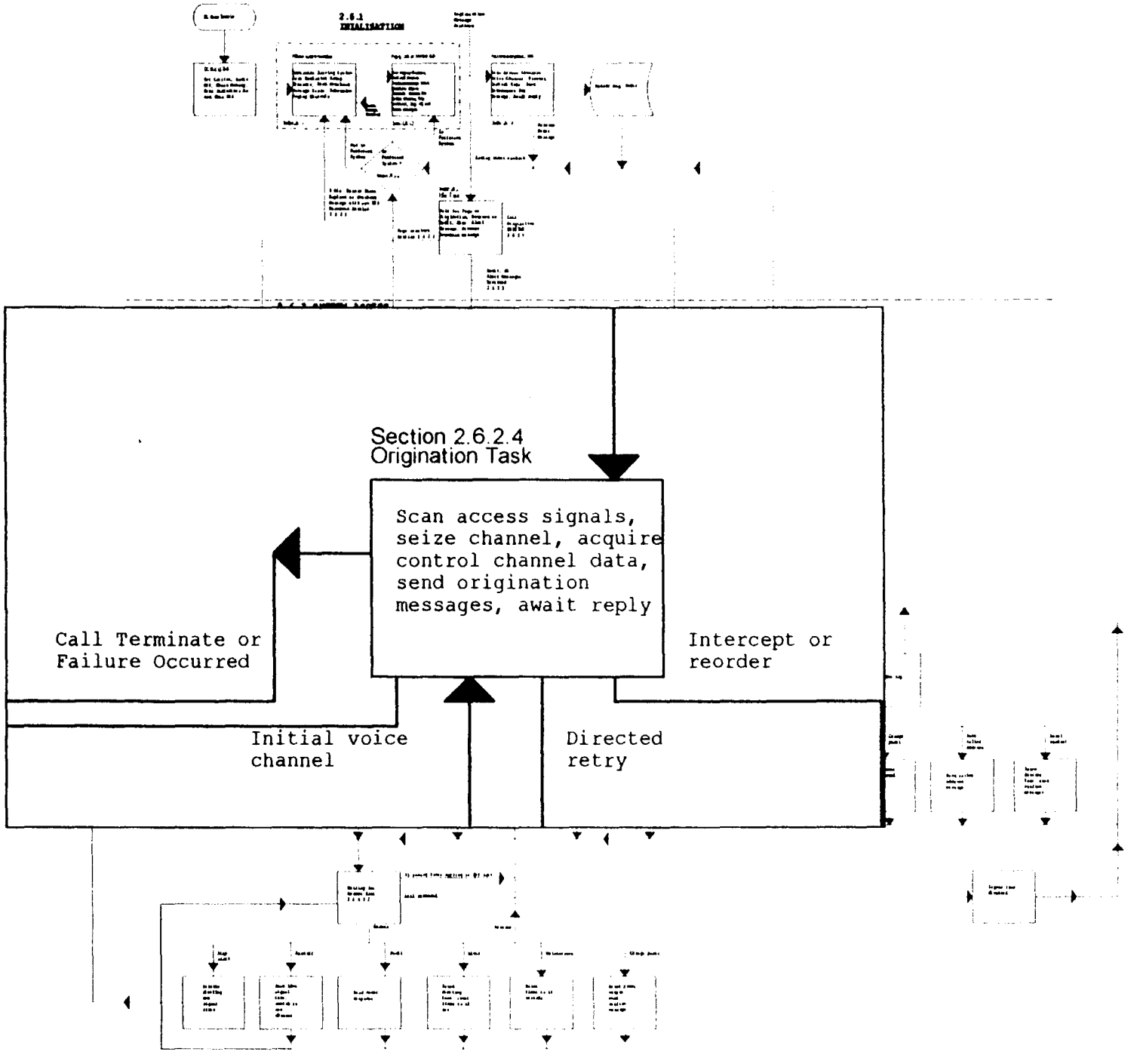
Lock on strongest channel

Seize Reverse Control Channel

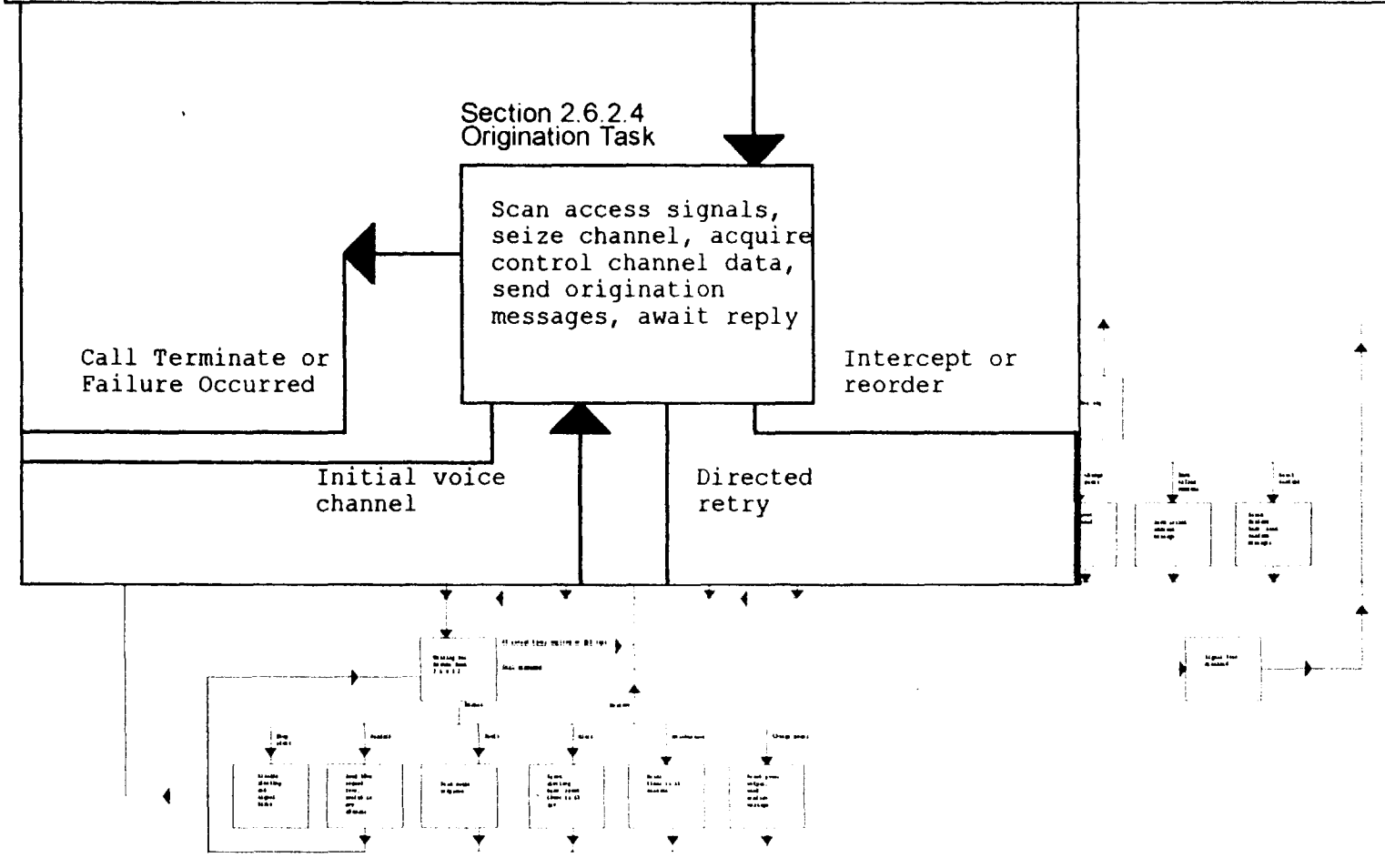
Connect to the PSAP


2.6.1
INITIALISATION
2.6.3 SYSTEM ACCESS
2.6.4 VOICE CHANNEL
CONTROL

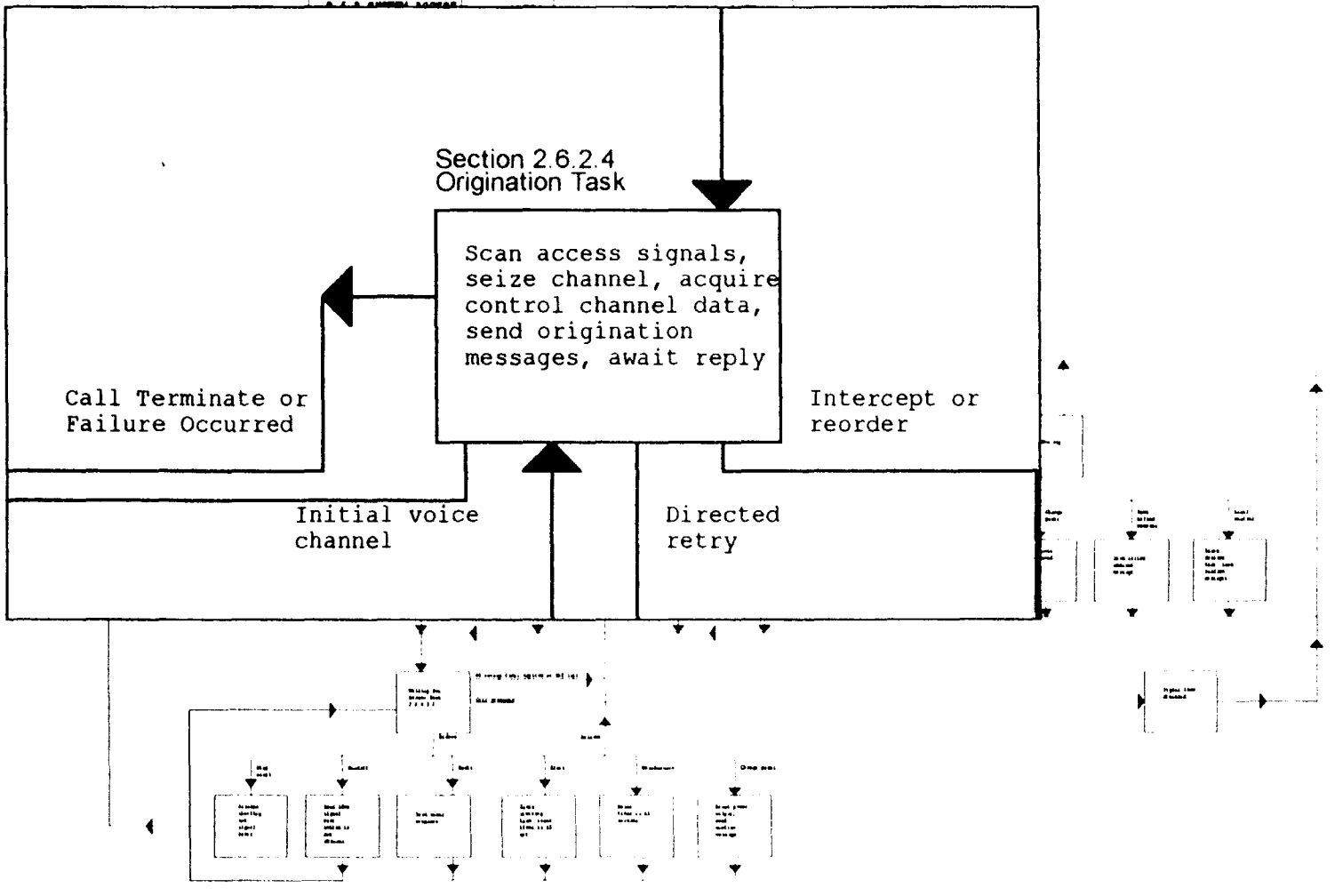

2.6.1
INITIALISATION
2.6.3 SYSTEM ACCESS
Section 2.6.2
Idle Task
Wait for Page or Origination, Respond to Audit, Abbr. Alert Message, Process Overhead Message
Page received Section 2.6.2.2
Call Origination Section 2.6.2.4
Audit, AB. Alert Messages Received 2.6.2.3


Section 2.6.2.4
Origination Task
Scan access signals, seize channel, acquire control channel data, send origination messages, await reply
Call Terminate or Failure Occurred
Intercept or reorder
Initial voice channel
Directed retry

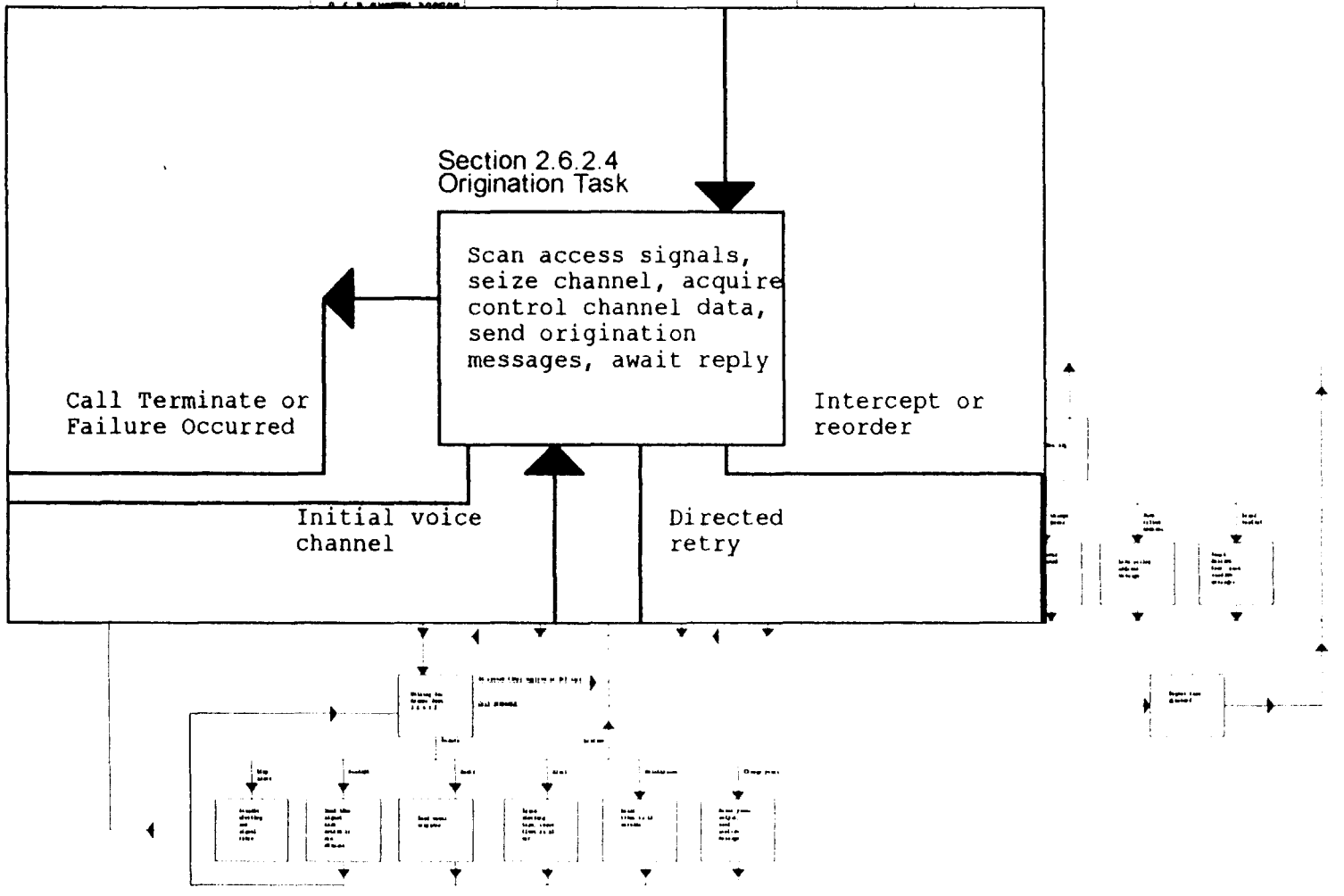
```
SCNDCC:
JBR     EMGNCY_B,NON911      ; IF NOT 911 CALL – JUMP

MOVW    BA,#354  ; Set A and B register to Last Dedicated Control Channel of B system (354)
JBS     SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW    BA,#313 ; Set A and B register to Last Dedicated Control Channel of A system (313)
MOV     R6,#42 ; Set R6 to 42
```



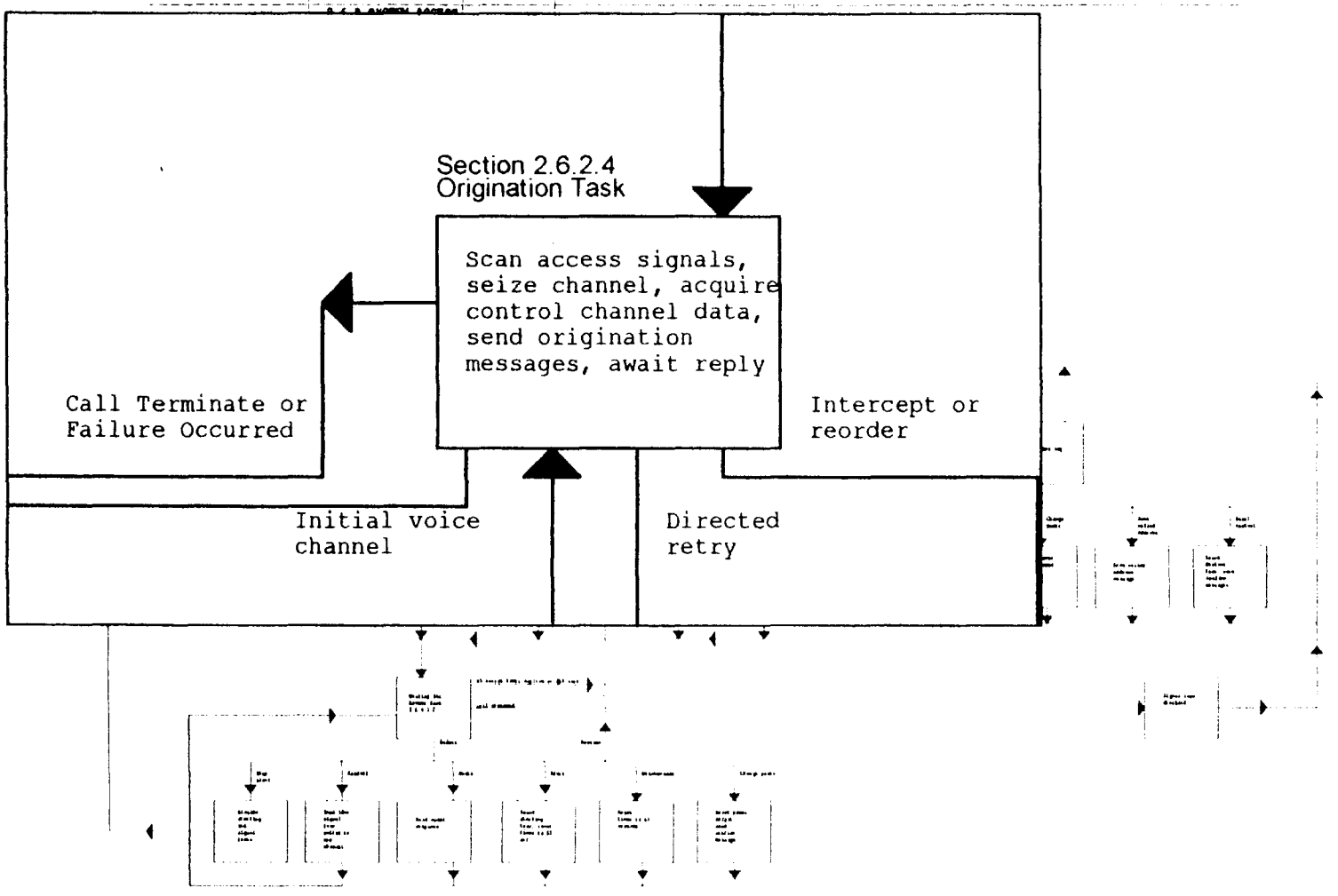
```
NON911:
MOVW    BA,#IDCCA  ; Set A and B register to First Dedicated Control Channel of A system (333)
JBS     SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW    BA,#IDCCB ; Set A and B register to First Dedicated Control Channel of B system (334)
MOV     R6,#NDED ; Set R6 to 21 (NDED contains 21)
```



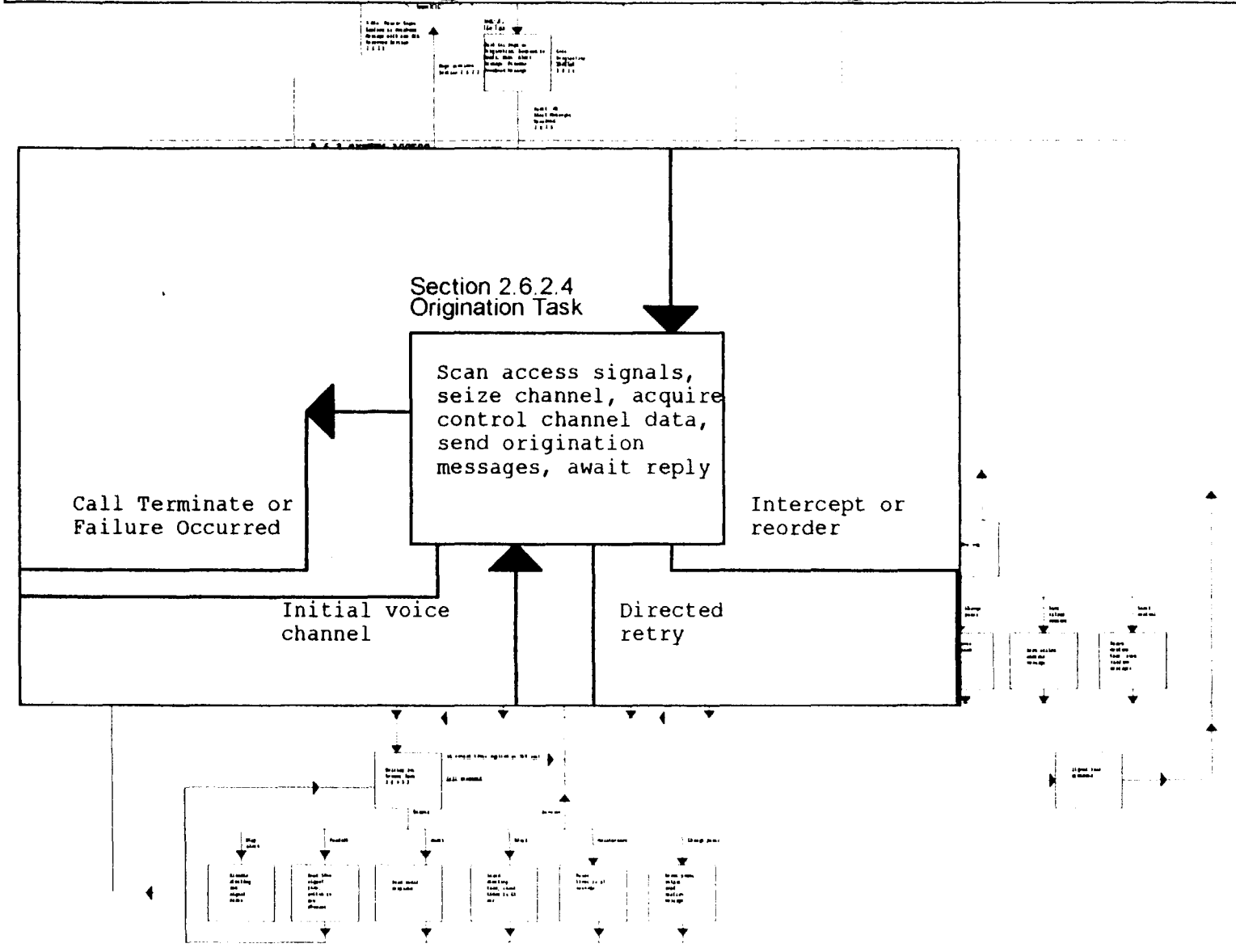
```
DCCHS1:
        ST      B,CHAN_D+1 ; Store the Channel number from above into the Channel Variable
        ST      A,CHAN_D
        MOV     R6,#NDED ; Set R6 to 21 (NDED contains 21)
        CAL     SCNCC ; Call the Scan Control Channel Routine
```



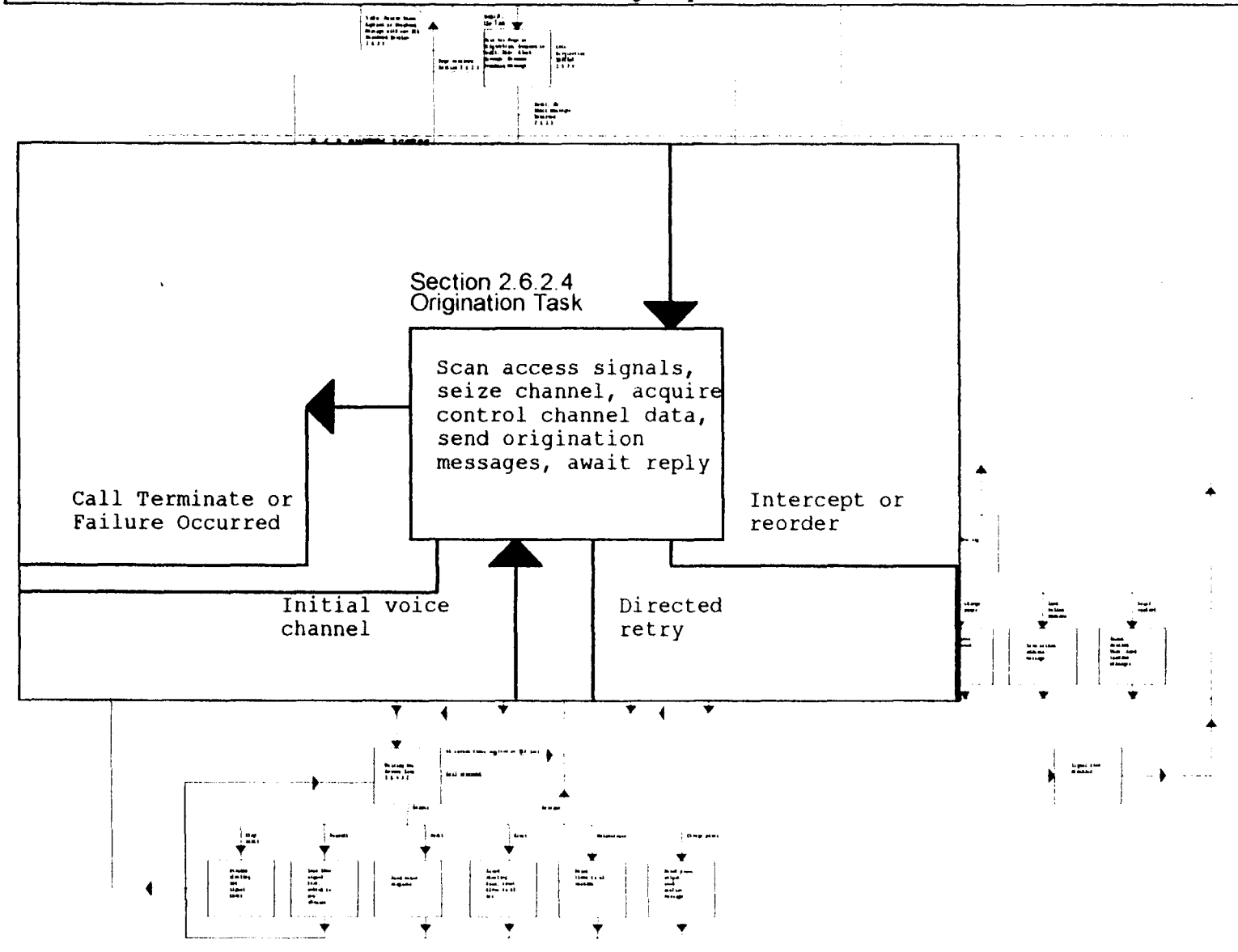
```
SCNCC:
        CLRW    BA ; Clear the B and A registers
        ST      A,RSSI1_D       ; RSSI1_D <--- 0 (This is the strongest Channel level)
        ST      A,RSSI2_D       ; RSSI2_D <--- 0 (This is the second strongest Channel level)
        MOVW    CHWK1_D,BA      ; CHWK1_D <--- 0 (This is the strongest Channel number)
        MOVW    CHWK2_D,BA      ; CHWK2_D <--- 0 (This is the second strongest Channel number)
        MOV     NLIST_D,R6 ; Move the number of Control Channels to scan into NLIST_D (21 or 42)
```



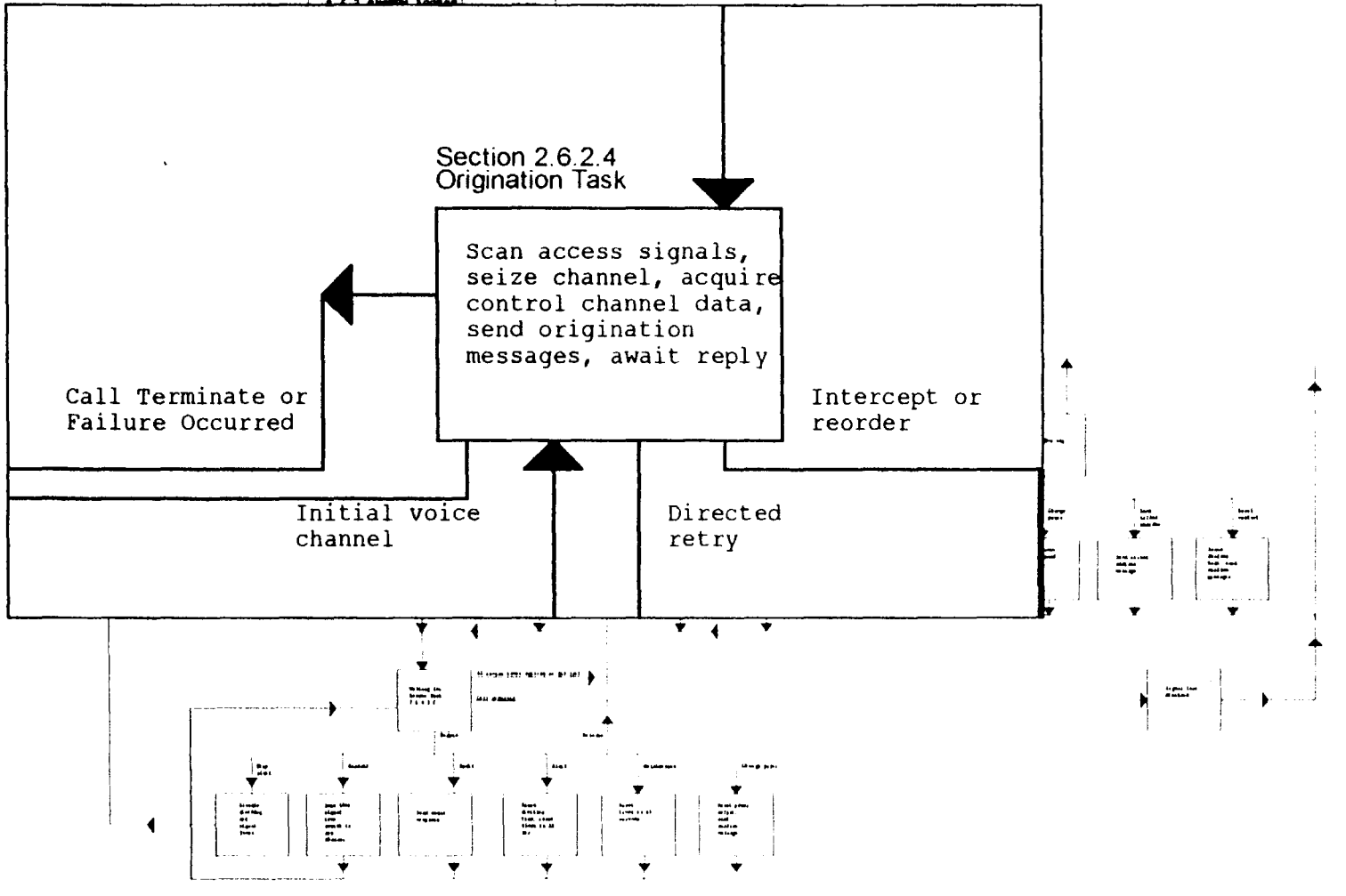
```
        CALL   FREQS  ; Tune to CHAN_D
SCNC1:
        CALL   RSSR             ; Read RSSI
        MOV    RSSI_D,A   ; Store value into RSSI_D
```



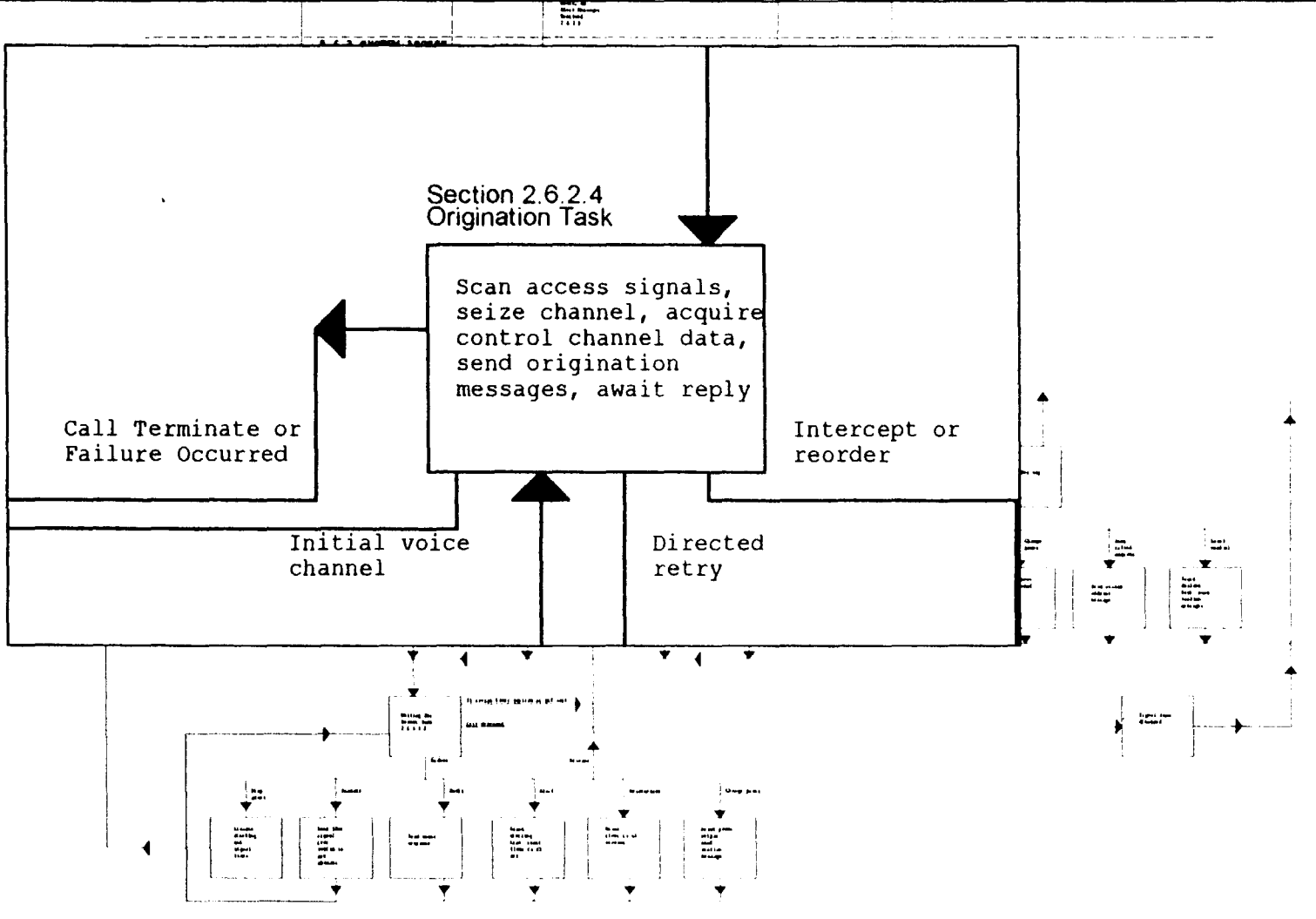
```
; Compare new RSSI value to Largest RSSI value so far.
                MOV   A,RSSI1_D   ; Load RSSI1_D into A register
                CJNE  A,RSSI_D,$+3 ; if RSSI1_D < RSSI_D
                JNC       SCNC5           ; jump if false
```



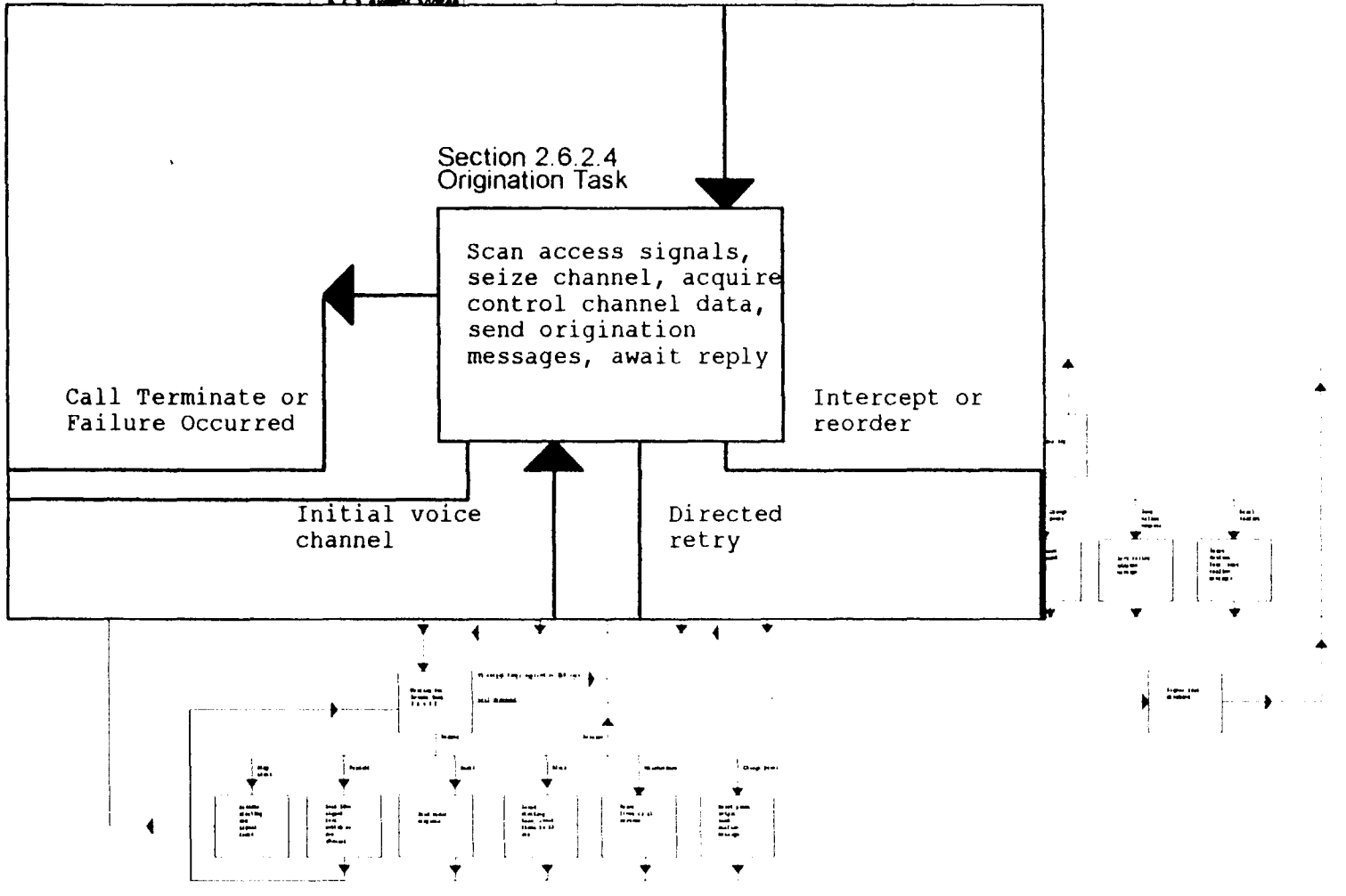
```
; Move RSSI1 to RSSI2 and new value into RSSI1
                MOV     RSSI2_D,RSSI1_D  ; RSSI2_D <--- RSSI1_D
                MOV     RSSI1_D,RSSI_D   ; RSSI1_D <--- RSSI_D
; Shift Channel numbers down to correspond to RSSI values
                MOVW  BA,CHWK1_D
                MOVW  CHWK2_D,BA    ; CHWK2_D <--- CHWK1_D
                MOVW  BA,CHAN_D
                MOVW  CHWK1_D,BA    ; CHWK1_D <--- CHAN_D
```



```
SCNC5:
        MOV   A,RSSI2_D ;(CSA) TO MAKE CJNE VALID
        CJNE  A,RSSI_D,$+3   ; if RSSI2_D < RSSI_D
        JNC       SCNC6          ; jump if false
        MOV       RSSI2_D,RSSI_D   ; RSSI2_D <--- RSSI_D
        MOVW  BA,CHAN_D
        MOVW  CHWK2_D,BA     ; CHWK2_D <--- CHAN_D
```

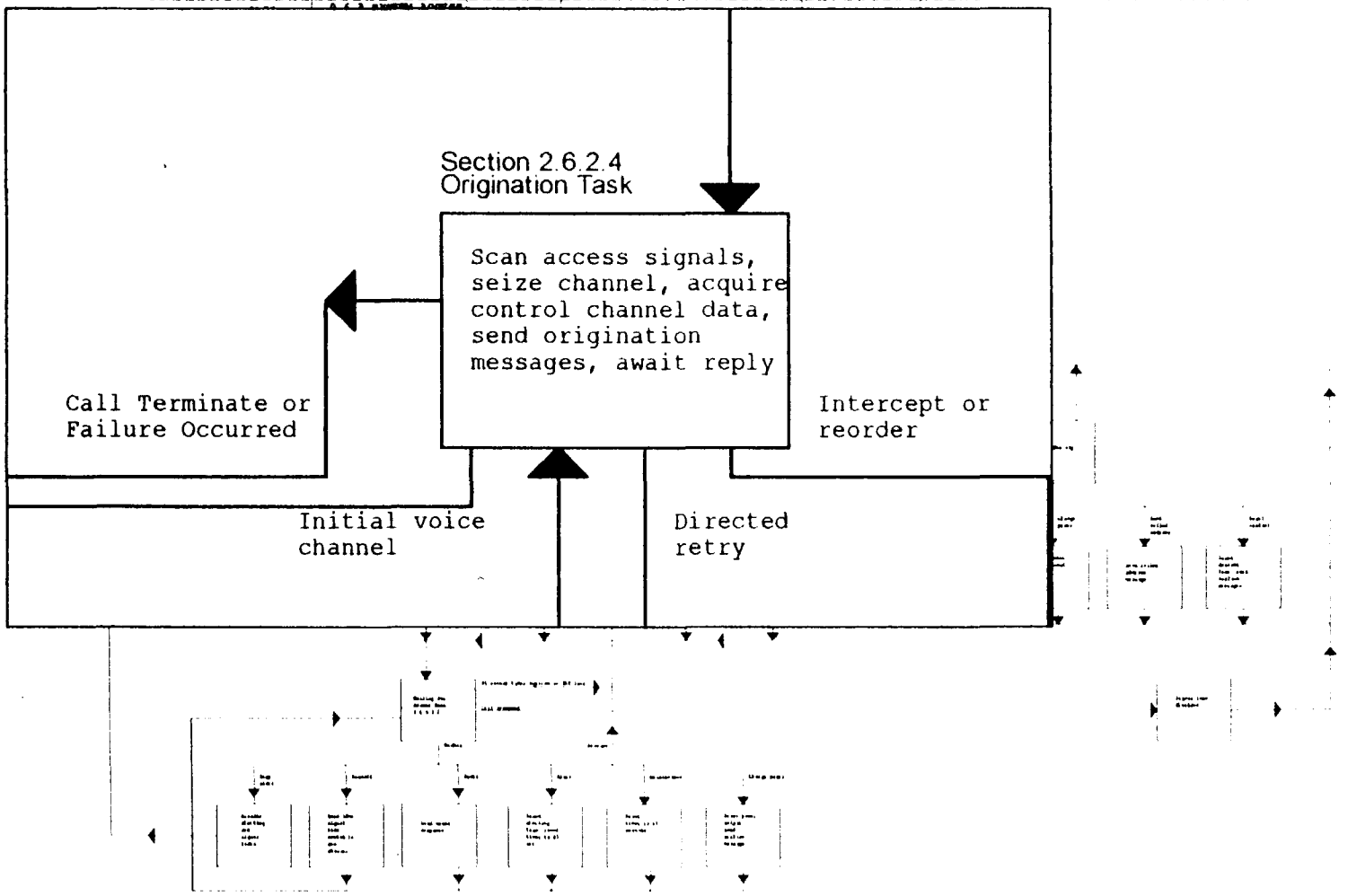


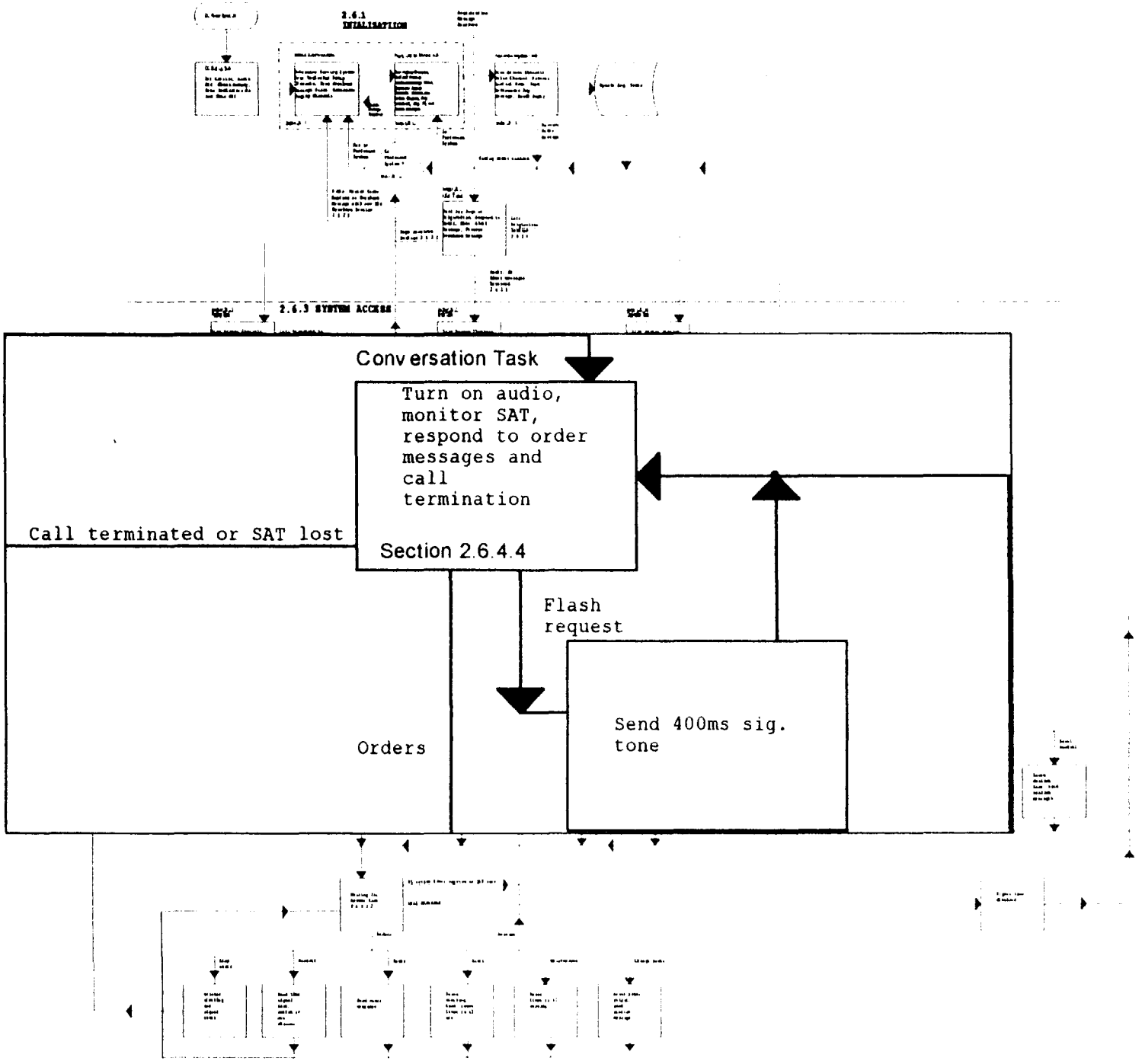
```
MOV  A,NLIST_D ; Load A register with Number of Control Channels
DEC  A         ; Decrement A
ST   A,NLIST_D ; Store A into Number of Control Channels
JZ   SCNC7     ; If A = 0 then Jump to SCN7 (Done with loop)
CALL CNTUPCH   ;COUNT UP CHANNEL

CALL FREQS ;   Tune to new channel
JMP  SCNC1 ;   Go back to the top
```



CHWK1_D is moved to CHAN_D and the channel is tuned.

```
MOV CHAN_D,CHWK1_D
MOV CHAN_D+1,CHWK1_D+1
MOV RSSI_D,RSSI1_D
JMP  TUNEC ; Jump to tune channel routine
```

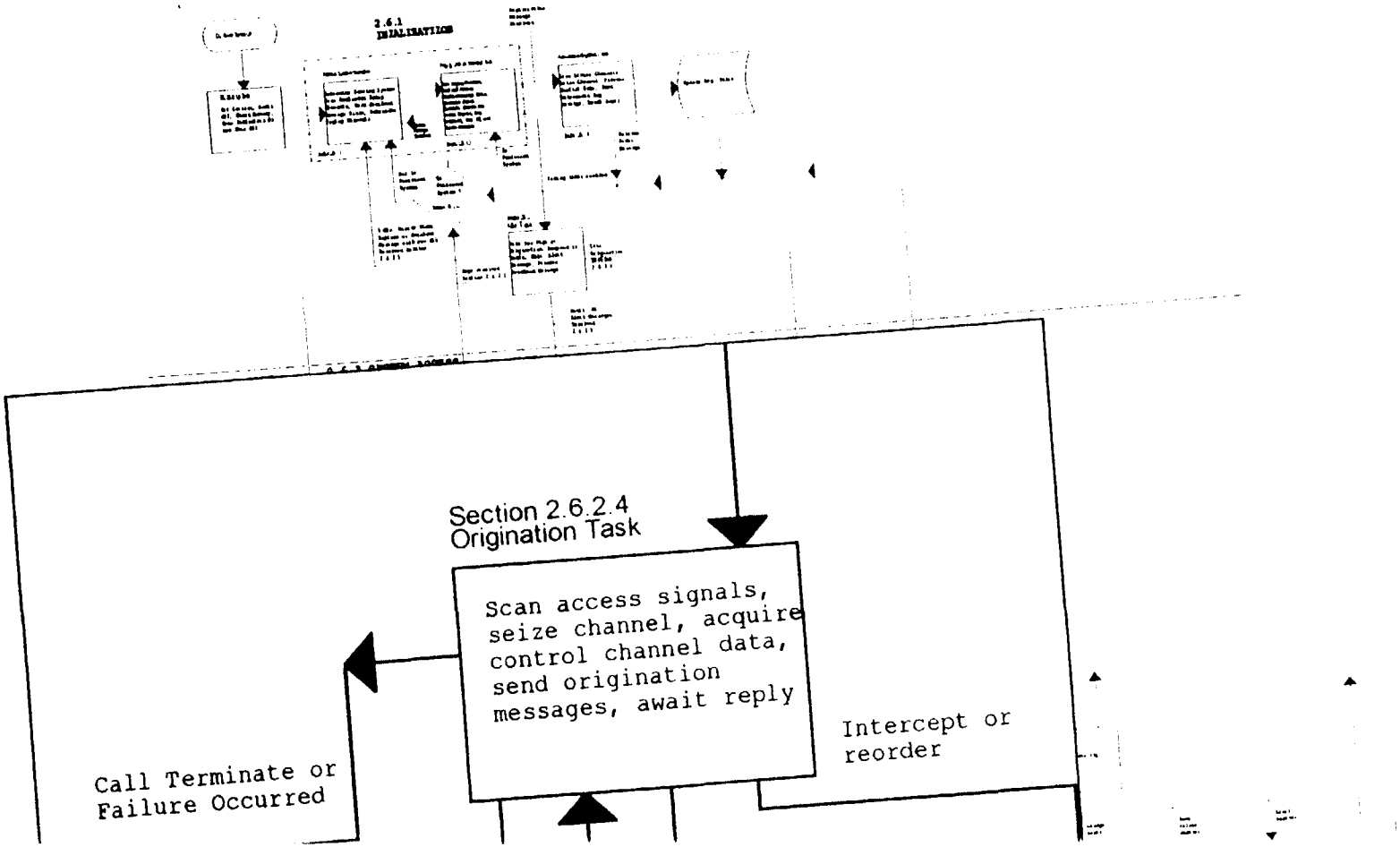



Conversation Task
Turn on audio, monitor SAT, respond to order messages and call termination
Section 2.6.4.4
Call terminated or SAT lost
Flash request
Send 400ms sig. tone
Orders

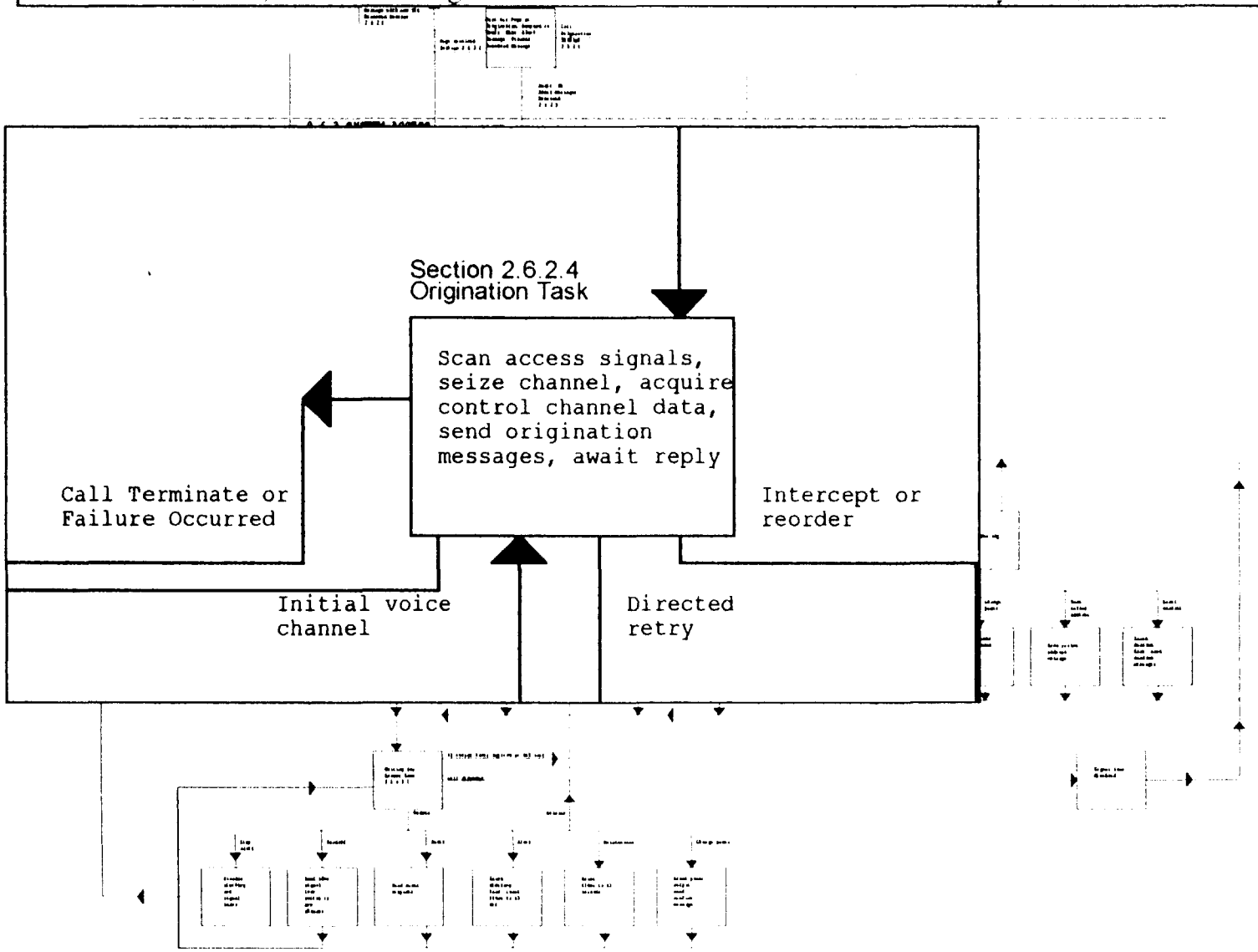
Strongest/Adequate Signal

- Scan all 21 control channels for Preferred System
  - Section 2.6.3.2
- Compare strongest channel to preset Limit (-80 dBm)
- If RSSI is greater than or equal to Limit
  - Tune to Channel
  - Seize Reverse Control Channel
  - Connect to PSAP
- If RSSI is less than the Limit
  - Scan remaining control channels
  - tune to strongest channel across 42 control channels
  - Seize Reverse Control Channel
  - Connect to the PSAP

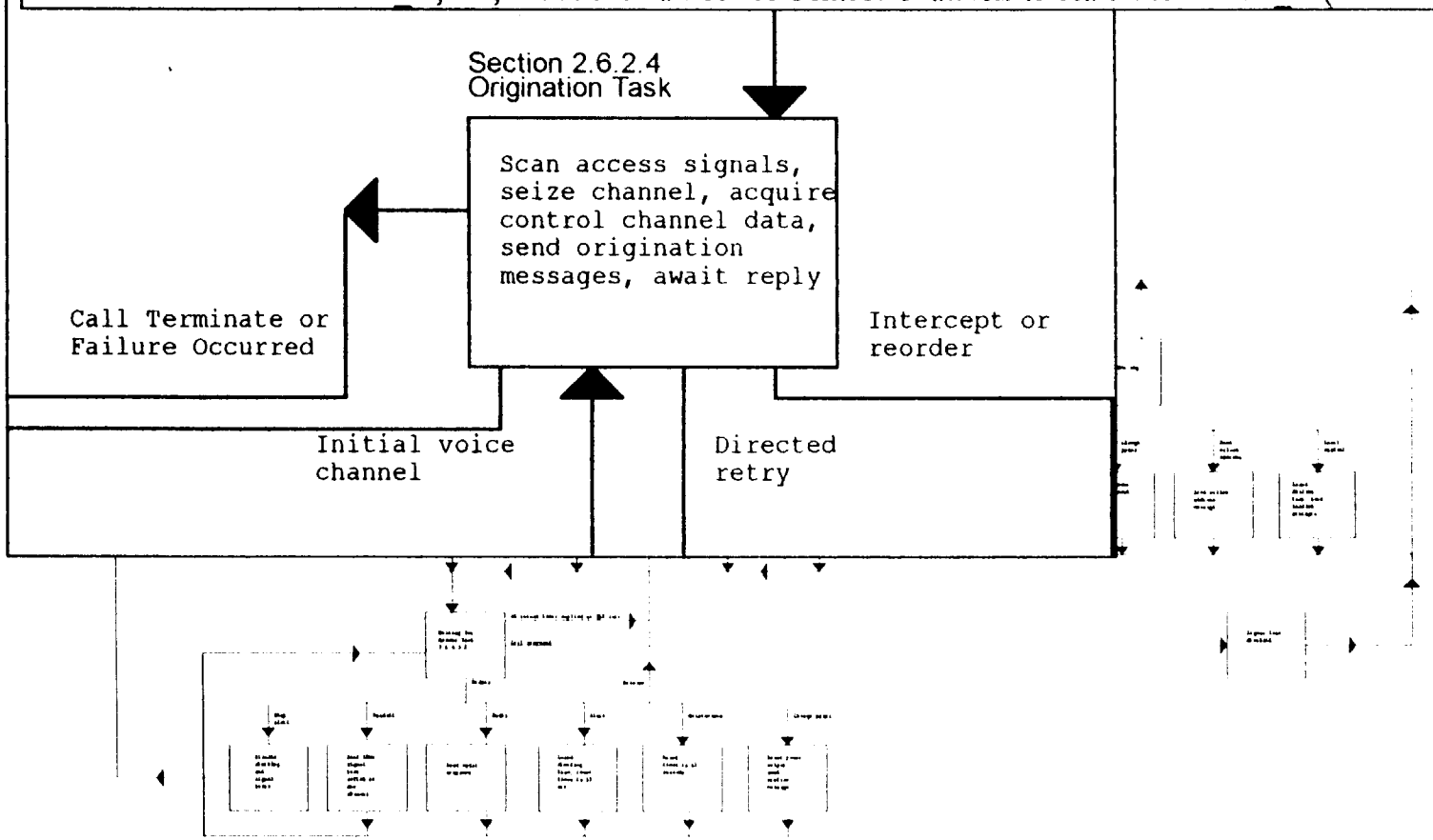
```
;          SCAN DEDICATED CONTROL CHANNEL;
SETB   FIRSTPASS ; This will indicate if this is the first time through this code
SCNDCC:

JBR       FIRSTPASS, SCNDCC2      ; IF NOT FIRSTPASS CALL  JUMP
MOVW    BA,#IDCCA  ; Set A and B register to First Dedicated Control Channel of A system (333)
JBS        SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW    BA,#IDCCB ; Set A and B register to First Dedicated Control Channel of B system (334)
JMP     DCCHS1
```



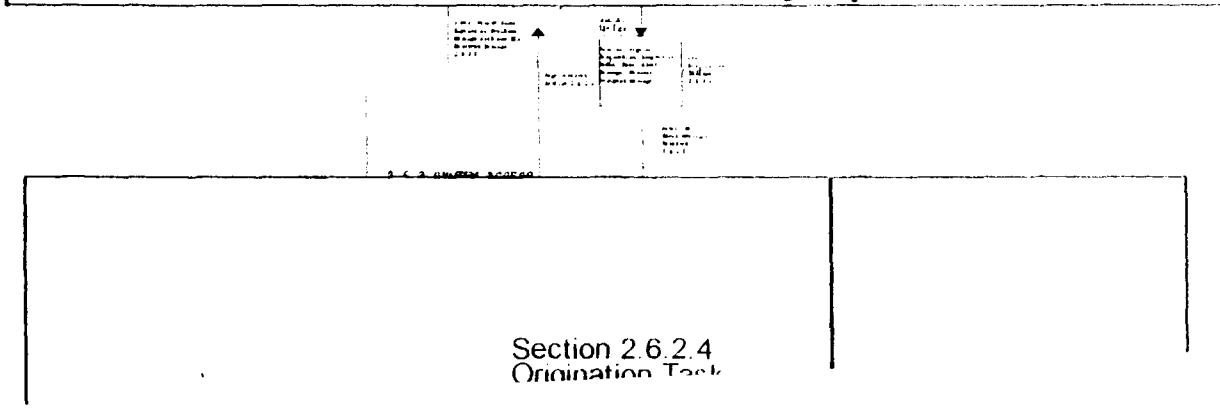
```
SCNDCC2:
MOVW    BA,#354  ; Set A and B register to Last Dedicated Control Channel of B system (354)
JBS     SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW    BA,#313 ; Set A and B register to Last Dedicated Control Channel of A system (313)
```



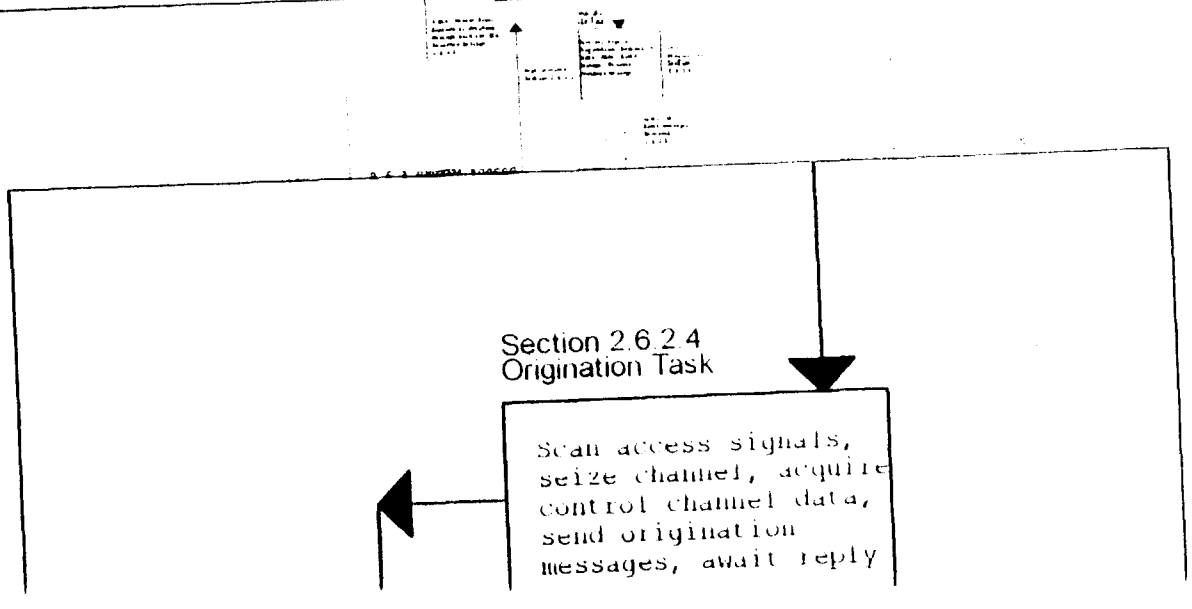
```
;                SCAN CONTROL CHANNEL;
SCNCC:
; This will force the code to clear the scan list on the first pass only.
JBR     FIRSTPASS, SECONDPASS          ; IF NOT FIRSTPASS CALL – JUMP
        CLRW    BA ; Clear the B and A registers
        ST      A,RSSI1_D      ; RSSI1_D <--- 0 (This is the strongest Channel level)
        ST      A,RSSI2_D      ; RSSI2_D <--- 0 (This is the second strongest Channel level)
        MOVW    CHWK1_D,BA     ; CHWK1_D <-- 0 (This is the strongest Channel number)
        MOVW    CHWK2_D,BA     ; CHWK2_D <-- 0 (This is the second strongest Channel number)
        MOV     NLIST_D,R6 ; Move the number of Control Channels to scan into NLIST_D (21 or 42)
```



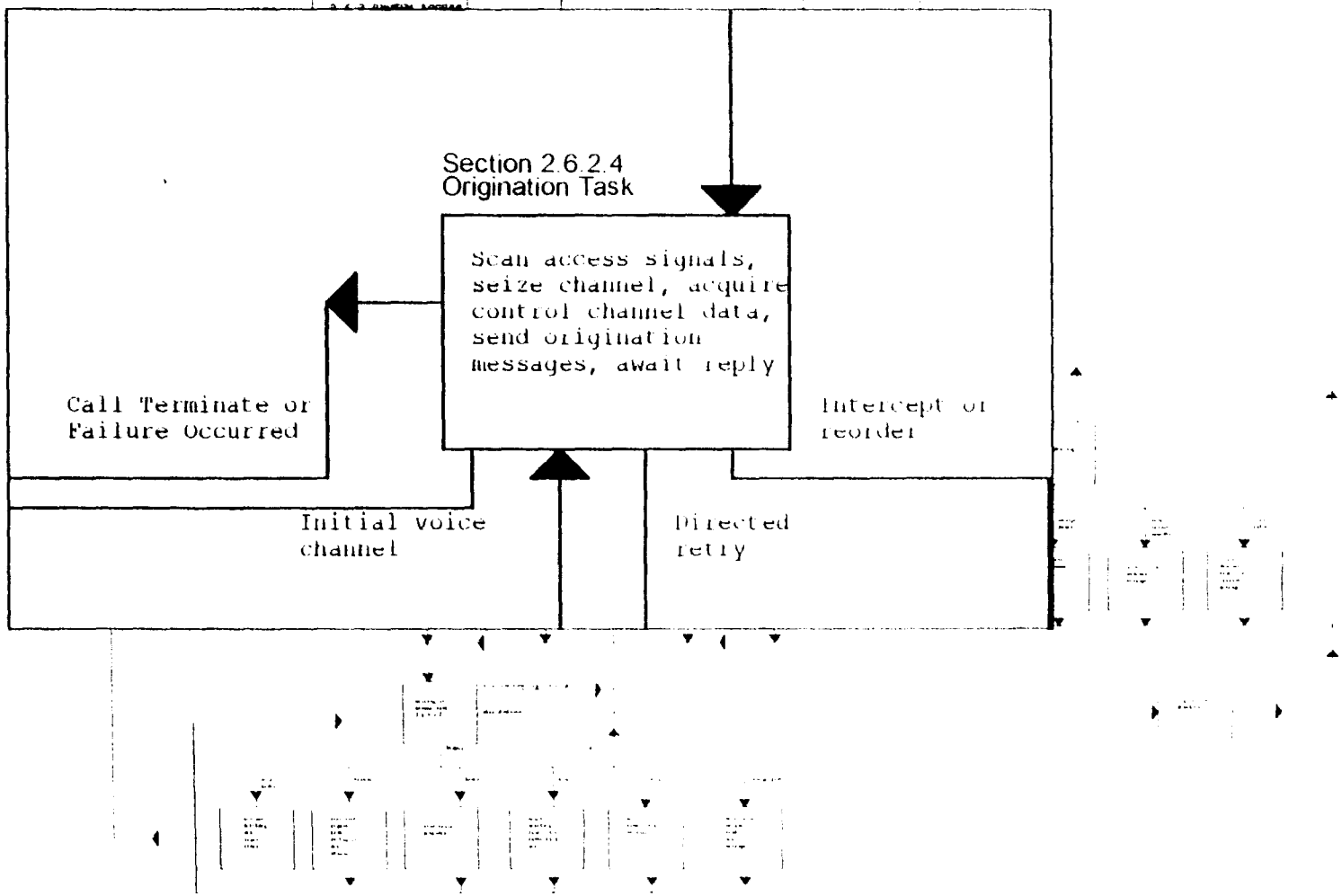
```
; Compare new RSSI value to Largest RSSI value so far.
                MOV   A,RSSI1_D   ; Load RSSI1_D into A register
                CJNE  A,RSSI_D,$+3 ; if RSSI1_D < RSSI_D
                JNC       SCNC5           ; jump if false
```



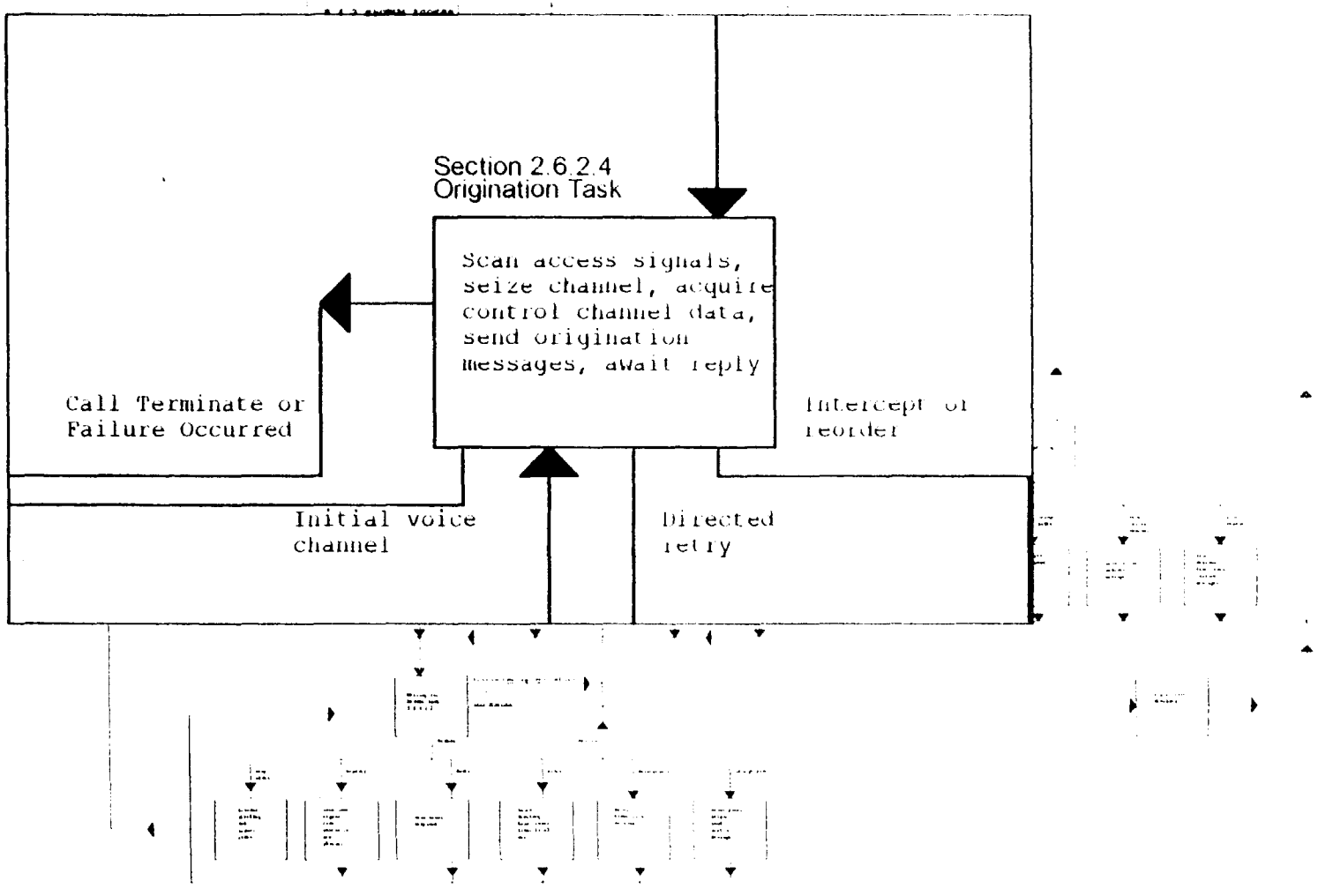

```
                CALL  FREQS ; Tune to CHAN_D
SCNC1:
                CALL  RSSR              ; Read RSSI
                MOV       RSSI_D,A      ; Store value into RSSI_D
```



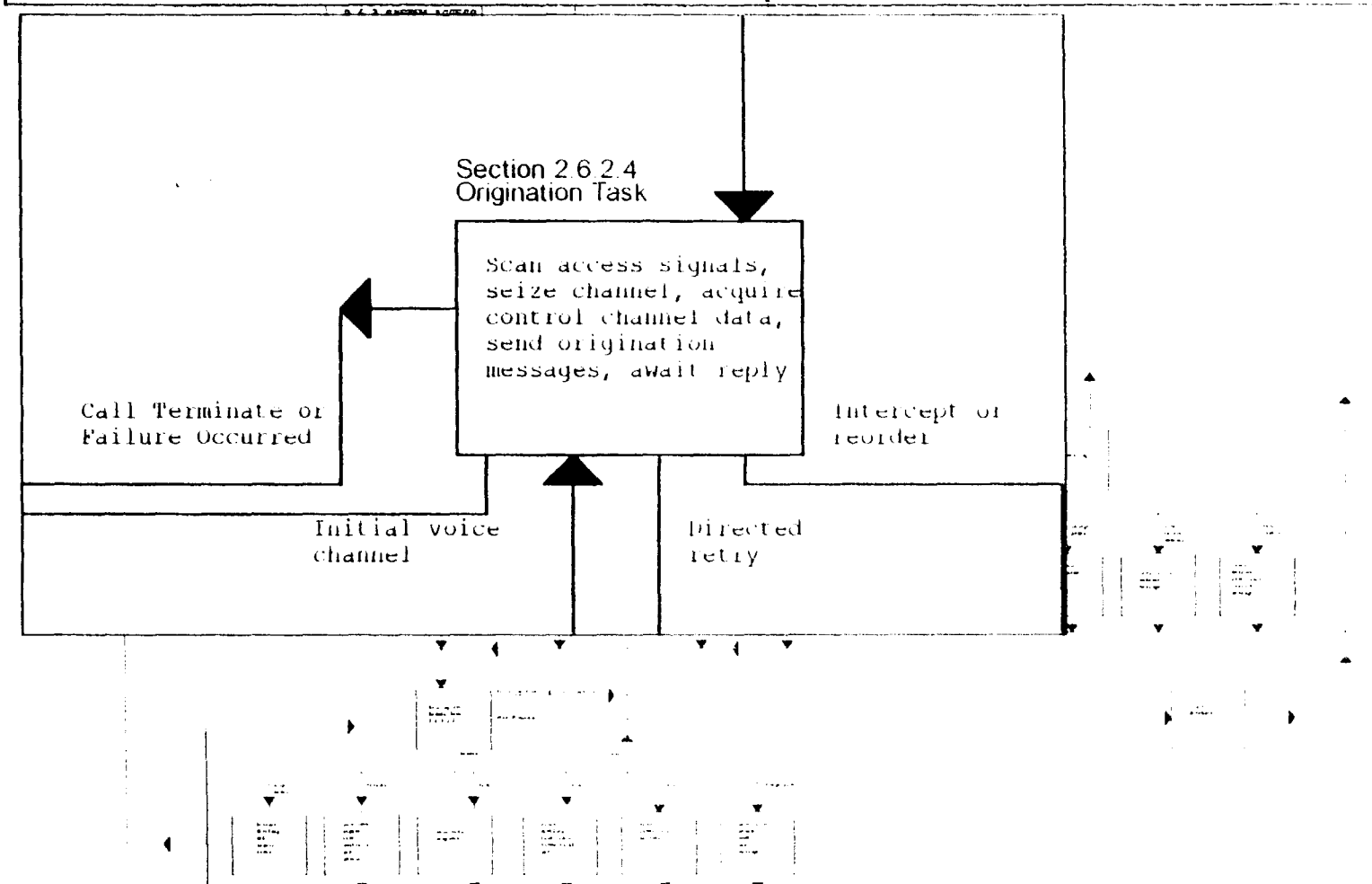
```
; Move RSSI1 to RSSI2 and new value into RSSI1
                MOV     RSSI2_D,RSSI1_D  ; RSSI2_D <--- RSSI1_D
                MOV     RSSI1_D,RSSI_D   ; RSSI1_D <--- RSSI_D
; Shift Channel numbers down to correspond to RSSI values
                MOVW    BA,CHWK1_D
                MOVW    CHWK2_D,BA       ; CHWK2_D <--- CHWK1_D
                MOVW    BA,CHAN_D
                MOVW    CHWK1_D,BA       ; CHWK1_D <--- CHAN_D
```



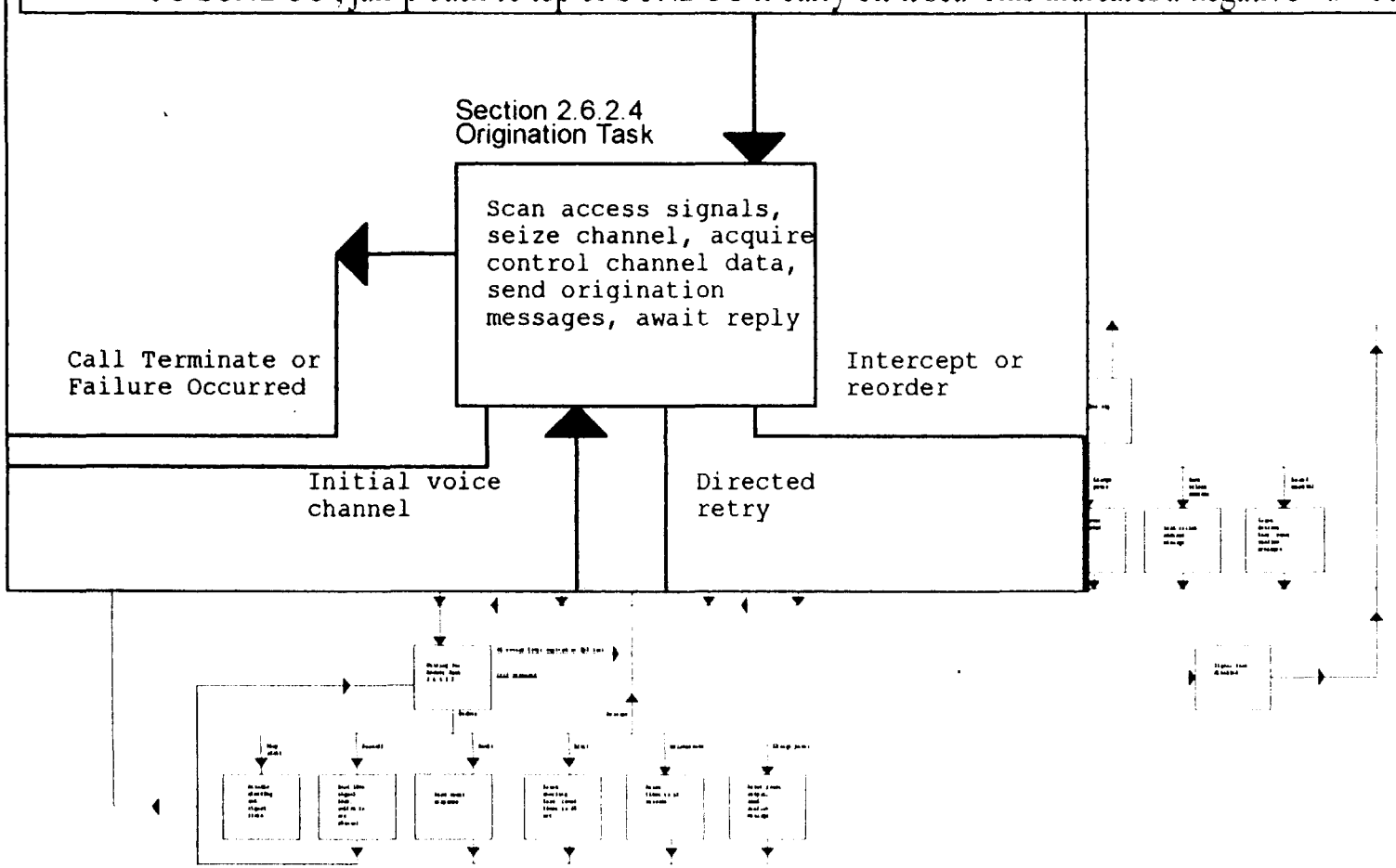
```
SCNC5:
        MOV   A,RSSI2_D ;(CSA) TO MAKE CJNE VALID
        CJNE  A,RSSI_D,$+3   ; if RSSI2_D < RSSI_D
        JNC       SCNC6          ; jump if false
        MOV       RSSI2_D,RSSI_D   ; RSSI2_D <--- RSSI_D
        MOVW  BA,CHAN_D
        MOVW  CHWK2_D,BA     ; CHWK2_D <--- CHAN_D
```



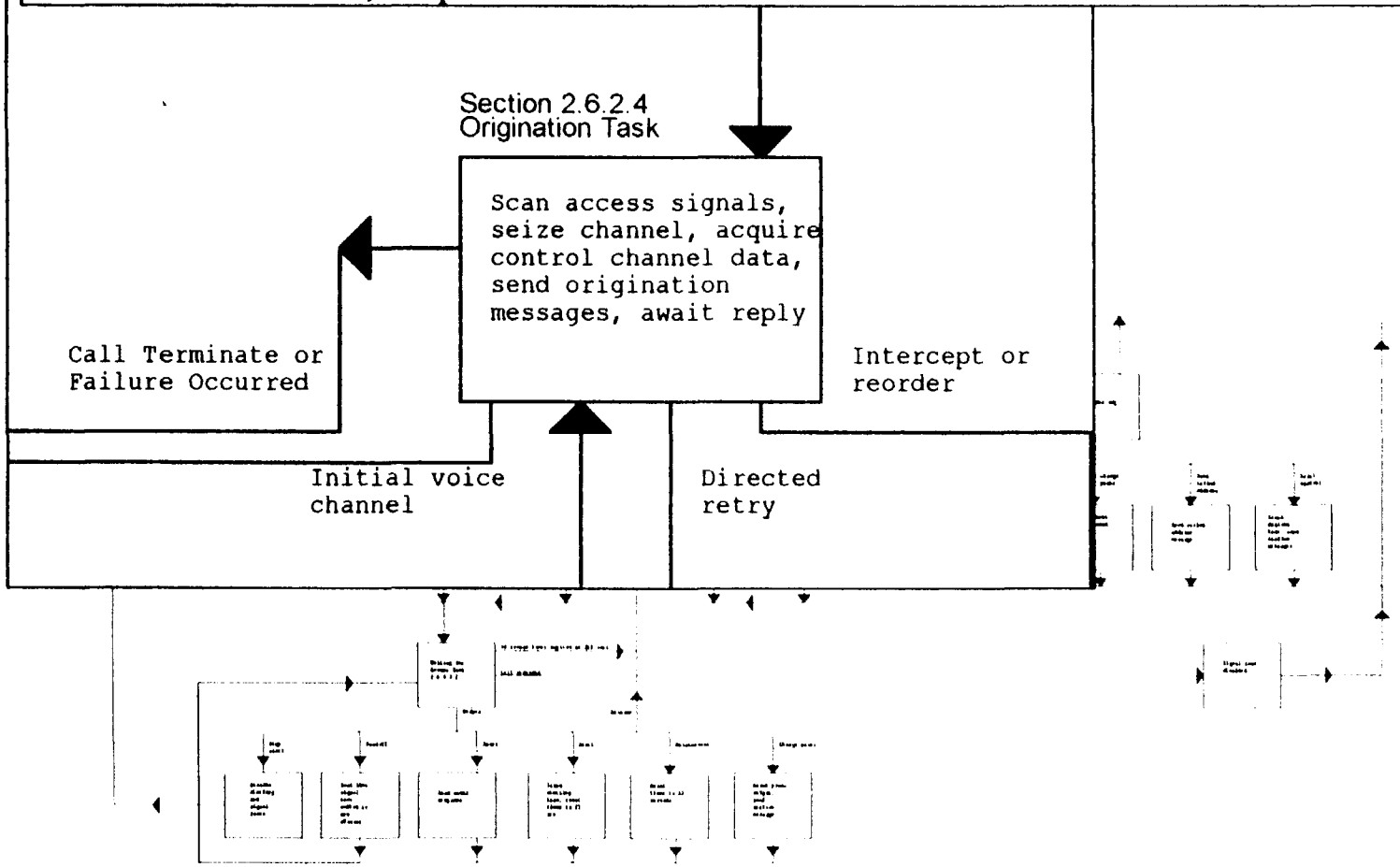
```
MOV  A,NLIST_D ; Load A register with Number of Control Channels
DEC  A         ; Decrement A
ST   A,NLIST_D ; Store A into Number of Control Channels
JZ   SCNC7     ; If A = 0 then Jump to SCN7 (Done with loop)
CALL CNTUPCH   ;COUNT UP CHANNEL

CALL FREQS ;   Tune to new channel
JMP  SCNC1 ;   Go back to the top
```

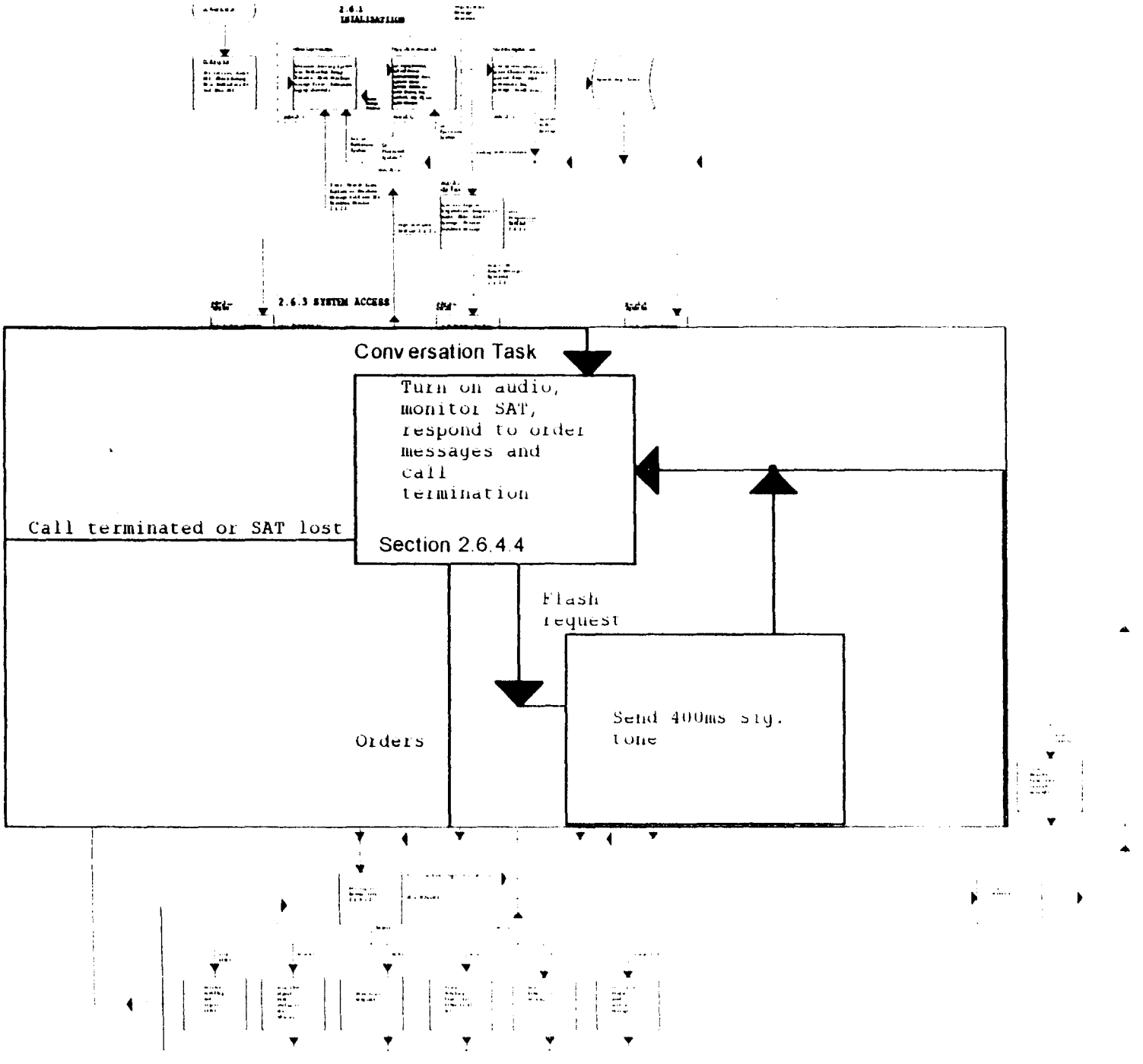


```
JBR     EMGNCY_B,NON911      ; IF NOT 911 CALL – JUMP
;This level will be compared to –80 dBm or greater if this is the first pass
JBR     FIRSTPASS, NOCOMPARE; IF NOT FIRSTPASS CALL – JUMP
CLR     FIRSTPASS ; This will indicate if this is the second time through this code
MOV A,RSSII_D
SUBC A, #133 ; Subtract decimal 133 which corresponds to –80 dBm
JC SCNDCC ; jump back to top of SCNDCC if carry bit it set. This indicates a negative number.
```



```
; The Value is greater than or equal to -80dBm
NOCOMPARE:
NON911:
        ;CHWK1_D is moved to CHAN_D and the channel is tuned.
        MOV  CHAN_D,CHWK1_D
        MOV  CHAN_D+1,CHWK1_D+1
        MOV  RSSI_D,RSSI1_D
        JMP   TUNEC ; Jump to tune channel routine
```




Conversation Task
Turn on audio, monitor SAT, respond to order messages and call termination
Section 2.6.4.4
Call terminated or SAT lost
Flash request
Send 400ms sig. tone
Orders

Cost to Implement

	Strongest/Adequate Signal with Adjustable Threshold Level	Strongest/Adequate Signal	Strongest Signal
Lines of Code	160	25	20
Bytes of Code	480	75	60
Code Analysis	$120,000.00	$60,000.00	$60,000.00
Code Mod.	$240,000.00	$37,500.00	$30,000.00
Code Testing	$360,000.00	$240,000.00	$240,000.00
Manufacturing	$224,000.00	$224,000.00	$224,000.00
Documentation	$250,000.00	$0.00	$0.00
Total	$1,194,000.00	$561,500.00	$554,000.00
Cost/Handset	$0.12	$0.06	$0.06

Original Code for section 2.6.3.2

From Memory Initialization Task

```
NDED   EQU    21      ;
IDCCA  EQU    333     ;
IDCCB  EQU    334     ;
```

From Scan Dedicated Control Channel Task.

```
;       SCAN DEDICATED CONTROL CHANNEL;
SCNDCC:
MOVW    BA,#IDCCA  ; Set A and B register to First Dedicated Control Channel of A system (333)
JBS     SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW    BA,#IDCCB ; Set A and B register to First Dedicated Control Channel of B system (334)

DCCHS1:
        ST      B,CHAN_D+1 ; Store the Channel number from above into the Channel Variable
        ST      A,CHAN_D
        MOV     R6,#NDED ; Set R6 to 21 (NDED contains 21)
        CAL     SCNCC ; Call the Scan Control Channel Routine
```

This routine is called with the value of R6 = NDED

```
;               SCAN CONTROL CHANNEL;
SCNCC:
        CLRW    BA ; Clear the B and A registers
        ST      A,RSSI1_D       ; RSSI1_D <--- 0 (This is the strongest Channel level)
        ST      A,RSSI2_D       ; RSSI2_D <--- 0 (This is the second strongest Channel level)
        MOVW    CHWK1_D,BA   ; CHWK1_D <--- 0 (This is the strongest Channel number)
        MOVW    CHWK2_D,BA   ; CHWK2_D <--- 0 (This is the second strongest Channel number)
        MOV     NLIST_D,R6 ; Move the number of Control Channels to scan into NLIST_D (21)
```

Code to tune to the CHAN_D and read the RSSI value is here
This will include incrementing the channel through the required number of control channels.
The NLIST_D variable will decrement. If it is not zero the loop will continue.

RSSI1_D will contain the strongest level read across the 21 control channels.
CHWK1_D will contain the channel number with the strongest RSSI level.
RSSI2_D will contain the second strongest level read across the 21 control channels.
CHWK2_D will contain the channel number with the second strongest RSSI level.

CHWK1_D is moved to CHAN_D and the channel is tuned.

```
        MOV  CHAN_D,CHWK1_D
        MOV  CHAN_D+1,CHWK1_D+1
        MOV  RSSI_D,RSSI1_D
        JMP   TUNEC ; Jump to tune channel routine
```

Strongest Signal Code for section 2.6.3.2

From Scan Dedicated Control Channel Task.

```
;          SCAN DEDICATED CONTROL CHANNEL;
SCNDCC:
JBR        EMGNCY_B,NON911          ; IF NOT 911 CALL - JUMP

MOVW       BA,#354  ; Set A and B register to Last Dedicated Control Channel of B system (354)
JBS        SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW       BA,#313  ; Set A and B register to Last Dedicated Control Channel of A system (313)
MOV        R6,#42 ; Set R6 to 42

NON911:
MOVW       BA,#IDCCA  ; Set A and B register to First Dedicated Control Channel of A system (333)
JBS        SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW       BA,#IDCCB ; Set A and B register to First Dedicated Control Channel of B system (334)
MOV        R6,#NDED ; Set R6 to 21 (NDED contains 21)

DCCHS1:
           ST        B,CHAN_D+1 ; Store the Channel number from above into the Channel Variable
           ST        A,CHAN_D
           CAL       SCNCC ; Call the Scan Control Channel Routine

;                    SCAN CONTROL CHANNEL;
SCNCC:
           CLRW      BA ; Clear the B and A registers
           ST        A,RSSI1_D       ; RSSI1_D <--- 0 (This is the strongest Channel level)
           ST        A,RSSI2_D       ; RSSI2_D <--- 0 (This is the second strongest Channel level)
           MOVW      CHWK1_D,BA      ; CHWK1_D <--- 0 (This is the strongest Channel number)
           MOVW      CHWK2_D,BA      ; CHWK2_D <--- 0 (This is the second strongest Channel number)
           MOV       NLIST_D,R6 ; Move the number of Control Channels to scan into NLIST_D (21 or 42)
```

Code to tune to the CHAN_D and read the RSSI value is here
This will include incrementing the channel through the required number of control channels.
The NLIST_D variable will decrement. If it is not zero the loop will continue.

RSSI1_D will contain the strongest level read across the 21 or 42 control channels.
CHWK1_D will contain the channel number with the strongest RSSI level.
RSSI2_D will contain the second strongest level read across the 21 or 42 control channels.
CHWK2_D will contain the channel number with the second strongest RSSI level.

CHWK1_D is moved to CHAN_D and the channel is tuned.

```
           MOV  CHAN_D,CHWK1_D
           MOV  CHAN_D+1,CHWK1_D+1
           MOV  RSSI_D,RSSI1_D
           JMP  TUNEC ; Jump to tune channel routine
```

Strongest/Adequate Signal Code for section 2.6.3.2

From Scan Dedicated Control Channel Task.

```
;          SCAN DEDICATED CONTROL CHANNEL;
SETB   FIRSTPASS ; This will indicate if this is the first time through this code
SCNDCC:

JBR      FIRSTPASS, SCNDCC2      ; IF NOT FIRSTPASS CALL - JUMP
MOVW     BA,#IDCCA  ; Set A and B register to First Dedicated Control Channel of A system (333)
JBS      SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW     BA,#IDCCB ; Set A and B register to First Dedicated Control Channel of B system (334)
JMP      DCCHS1

SCNDCC2:
MOVW     BA,#354  ; Set A and B register to Last Dedicated Control Channel of B system (354)
JBS      SSS_B,DCCHS1 ; Jump to DCCHS1 if SSS_B is set to true (This is the A system)
MOVW     BA,#313 ; Set A and B register to Last Dedicated Control Channel of A system (313)

DCCHS1:
         ST       B,CHAN_D+1 ; Store the Channel number from above into the Channel Variable
         ST       A,CHAN_D
         MOV      R6,#NDED ; Set R6 to 21 (NDED contains 21)
         CAL      SCNCC ; Call the Scan Control Channel Routine

;                 SCAN CONTROL CHANNEL;
SCNCC:
; This will force the code to clear the scan list on the first pass only
JBR      FIRSTPASS, SECONDPASS          ; IF NOT FIRSTPASS CALL - JUMP
         CLRW     BA ; Clear the B and A registers
         ST       A,RSSI1_D       ; RSSI1_D <--- 0 (This is the strongest Channel level)
         ST       A,RSSI2_D       ; RSSI2_D <--- 0 (This is the second strongest Channel level)
         MOVW     CHWK1_D,BA      ; CHWK1_D <--- 0 (This is the strongest Channel number)
         MOVW     CHWK2_D,BA      ; CHWK2_D <--- 0 (This is the second strongest Channel number)
         MOV      NLIST_D,R6 ; Move the number of Control Channels to scan into NLIST_D (21 or 42)

SECONDPASS:

Code to tune to the CHAN_D and read the RSSI value is here
This will include incrementing the channel through the required number of control channels.
The NLIST_D variable will decrement. If it is not zero the loop will continue.

RSSI1_D will contain the strongest level read across the 21 control channels.
CHWK1_D will contain the channel number with the strongest RSSI level.
RSSI2_D will contain the second strongest level read across the 21 control channels.
CHWK2_D will contain the channel number with the second strongest RSSI level.

         JBR      EMGNCY_B,NON911          ; IF NOT 911 CALL - JUMP
         This level will be compared to -80 dBm or greater if this is the first pass
         JBR      FIRSTPASS, NOCOMPARE; IF NOT FIRSTPASS CALL - JUMP
         CLR      FIRSTPASS ; This will indicate if this is the second time through this code
         MOV A,RSSI1_D
         SUBC A, #133 ; Subtract decimal 133 which corresponds to -80 dBm
         JC SCNDCC ; jump back to top of SCNDCC if carry bit it set. This indicates a negative number.
; The Value is greater than or equal to -80dBm
NOCOMPARE:
NON911:
         ;CHWK1_D is moved to CHAN_D and the channel is tuned.
         MOV CHAN_D,CHWK1_D
         MOV CHAN_D+1,CHWK1_D+1
         MOV RSSI_D,RSSI1_D
         JMP   TUNEC ; Jump to tune channel routine
```

Dave Carey
Giordano Automation Corp.
Vice President Applications Engineering

Dave has 15 years experience as a RF test/design engineer. He worked for 11+ years at Tobyhanna Army Depot developing test software for military communication equipment. He spent 2 years working for PRIMUS Technologies, a circuit board manufacturer, in Williamsport Pa. developing automatic test programs and designing test interface hardware for telecommunications equipment. He was hired at Giordano to develop the application engineering department.
Dave has a variety of accomplishments. He developed a demonstration program using VXI test assets, where he modeled a product and mapped its end to end functional test program into our Diagnostician tool. His electronic engineering and software background makes him very well qualified to work with both manufacturers and ATE suppliers to provide "Factory of the Future" solutions. He develops applications to automate test equipment in both commercial factories and field service depot operations. He also developed an embedded application in the Seawolf Submarines Fault Localization System for Ship Controls. He has designed, developed and maintained automatic test programs, test program interfaces for Automatic test stations, application test systems for a wide variety of circuit card assemblies (RF, digital, micro-controllers, video, and analog,) application test software using Microsoft Visual Basic and National Instruments LabWindows CVI. . He has designed assembly language software for telecommunications equipment. In this function he has become intimately familiar with the AMPS, TDMA and CDMA protocols for cellular telephone equipment. He has experience using, OrCAD 7.0 for interface design development and printed circuit card layout. He developed the ISO-9001 quality documentation and plans for test and design activities. This included supporting the ISO-9001 audit and subsequent updates to Design and Test documentation. He has been a program manager on several manufacturing jobs. This requires scheduling materials for production and test, tracking equipment and manpower resources, identifying production test failures, and performing failure trend analysis.

Awards: Walt Peterson IEEE Memorial Award for the "Most Technologically Significant" paper on "A New Breed of Smart Depot Testers using COTS Technology" at Autotestcon 1995, in Atlanta, Ga.

Education: Dave is a 1983 graduate of Wilkes University. He earned his Bachelor of Science, Electrical Engineering, with a minor in Physics.

On May 16th, 1998 he was awarded his Master of Science in Electrical Engineering at Wilkes University. Dave's thesis is titled: "Developing Diagnostic Test Programs using Model-Based Reasoning." He was awarded the "Most Outstanding Electrical Engineering Graduate Student" award for having the highest GPA, 3.90.